111-604

TRANSCRIPT OF RECORD.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1883.

No. 345.

ROBERT C. PHILLIPS, EUGENE ROBINSON, AND JESSE H. FARWELL, APPELLANTS,

vs.

THE CITY OF DETROIT.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE EASTERN DISTRICT OF MICHIGAN.

FILED OCTOBER 8, 1881.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1883.

No. 345.

ROBERT C. PHILLIPS, EUGENE ROBINSON, AND JESSE H. FARWELL, APPELLANTS,

vs.

THE CITY OF DETROIT.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE EASTERN DISTRICT OF MICHIGAN.

FILED OCTOBER 8, 1881.

INDEX.

	ORIGINAL.	PRINT.
Citation	1	1
Bill of complaint	2	1
Exhibit A.—Decree of the Circuit Court of the U. S. for the southern district of Ohio, Dec. 11, 1874	10	5
Exhibit B.—Decree of the Circuit Court of the U. S. for the district of Kentucky, May 15, 1875	14	7
Subpœna	17	8
Appearance of defendant	19	9
Answer of defendant	20	9
Replication	29	13
Proof of service of notice of motion	31	14
Note of issue, October 21, 1876	33	15
Stipulation as to patent of complainant	34	15
Amendment to answer	36	16
Stipulation that commission issue	37	16
Order that bill be returned to file	38	17
Affidavit of Jesse H. Farwell, June 27, 1877	39	17
Order for preliminary injunction	41	18
Order modifying preliminary injunction	42	18
Second amendment to answer	43	19
Stipulation as to preliminary injunction	45	20
Notice of application to file 2d amendment to answer	46	20
Order granting leave to file 2d amendment to answer	47	20
Motion and notice for commitment for contempt	48	21

	ORIGINAL.	PRINT.
Affidavit of Jesse H. Farwell, September 19, 1877	49	21
Exhibit X.—Specification and contract for combination pavement	53	23
Injunction and return	69	30
Argument of motion for contempt	72	31
Notice and proof of service of affidavits of Cook et al	73	32
Affidavit of Hubbard Smith, October 11, 1877	74	32
Affidavit of C. A. Cook, October 11, 1877	75	33
Affidavit of Valentine Hilsendegen, October 11, 1877	76	34
Affidavit of John A. Stewart, October 11, 1877	78	34
Affidavit of D. Farrand Henry, October 13, 1877	80	35
Note of issue, October 15, 1877	82	36
Notice and proof of service of affidavits of Robinson et al	83	36
Affidavit of Heman A. Lacey, October 10, 1877	84	37
Affidavit of Joseph B. Walton, October 10, 1877	85	37
Affidavit of Eugene Robinson, October 10, 1877	86	38
Argument of motion for attachment postponed	91	40
Application to file 3d amendment to answer	92	41
Affidavit of Nichol Mitchell, Wm. Purcell, and Alex. Chapeton, October 29, 1877	95	42
Affidavit of DeWitt C. Holbrook, October 29, 1877	102	45
Affidavit of William Buchanan, October 26, 1877	105	46
Affidavit of Adam Schulte, October 25, 1877	106	47
Affidavit of Ezra Hughes, October 25, 1877	107	47
Argument of motion for contempt	108	48
Order granting leave to file 3d amendment to answer	109	48
Order continuing injunction	110	48
Order modifying injunction	111	49
Notice of examining witnesses	112	49
Consent to substituting solicitors	113	50
Precipe for entry of order of substitution of solicitors	114	50
Stipulation extending time for taking testimony	115	50
Fourth amendment to answer	116	51
Consent to place case on docket	117	52
Stipulation as to proof	118	52
Subpœna and return	119	52
Deposition of C. D. Wheat, January 2, 1878	121	53
R. P. Kelly, January 11, 1878	123	54
Wm. Henry, January 12, 1878	124	54
Wm. Reed, January 14, 1878	125	55
H. F. Williams, January 18, 1878	127	56
Commission, &c	131	57
Notice of intent to take deposition of John W. Mundy, &c	137	60
Deposition of John W. Mundy, June 11, 1878	139	61
Certificate of commissioner, &c	153	67
Note of issue, October 24, 1878	156	68
Note of issue, February —, 1879	157	68
Letters patent granted Robert K. Phillips, December 5, 1871	158	68
Deposition of Alex. L. Patrick, October 29, 1878	163	71
Jesse H. Farwell, October 29, 1878	167	73

	ORIGINAL.	PRINT.
Deposition of Henry Gordon, October 29, 1878	168	74
George Crabbe, October 29, 1878	170	75
Alex. L. Patrick, November 15, 1878	173	77
Richard H. Coon, November 15, 1878	180	81
John F. McMillan, November 15, 1878	183	83
Alanson Sheley, November 19, 1878	188	85
Enos Lebot, November 19, 1878	189	86
Jesse H. Farwell, November 19, 1878	191	87
License to lay and use Phillips' patent pavement	195	89
Deposition of John H. Lawrence	198	91
Alex. L. Patrick, March 18, 1879	206	96
Eugene Robinson, March 18, 1879	208	97
Jessie H. Farwell, March 18, 1879	208	97
Chas. M. Dailey, March 18, 1879	208	98
Stipulation as to testimony of D. Farrand Henry	210	98
Deposition of D. Farrand Henry, March 1, 1879	211	99
James K. Thompson	233	111
Exhibit "Thompson 1." (Diagram.)	263	126
Deposition of Thomas Mackin	264	126
Exhibit "Mackin 1." (Diagram.)	273	131
Deposition of Henry L. Bristol	284	137
Deposition of Hubbard Smith, July 6, 1878	291	141
Alanson Sheley, January 10, 1878	302	148
John Owens, January 10, 1878	307	151
Jacob S. Farrand, January 10, 1878	309	152
Ichabod Goodrich, January 10, 1878	310	152
Alex. Chapoton, January 10, 1878	311	153
David Wilkie, January 10, 1878	317	157
James French, April 26, 1878	330	164
Exhibit A.—File wrapper in case of application of Talmage E. Brown, assignee, &c., for patent, (No. 101,590)	335	167
Exhibit B.—File wrapper in the matter of letters patent of Gardner Warren, (No. 96,062)	338	168
Exhibit C.—File wrapper in the matter of letters patent of D. C. Colby, (No. 101,100)	341	169
Stipulation as to English patents	343	170
Stipulation as to English and American patents	344	171
Stipulation as to McCarthy's patent	346	172
Stipulation as to Manning & Granger report	347	172
Specification and drawing of application of H. F. Williams for patent	348	173
Exhibit F.—Letters patent of Charles Guidet, (No. 85,814)	353	174
Exhibit G.—Letters patent of Henry M. Stow, (No. 74,862)	358	176
Exhibit H.—Letters patent of Gardner Warren (No. 96,062)	364	179
Exhibit L.—Letters patent of D. C. Colby (No. 101,100)	370	182
Exhibit M.—Letters patent of Tallmage E. Brown, (No. 101,590)	375	185
Argument of cause commenced	380	187
Argument of cause concluded	381	188
Final decree	382	188
Opinion of Court	383	188

	ORIGINAL.	PRINT.
Petition for allowance of appeal	395	194
Allowance of appeal	397	195
Stipulation as to return of exhibits	398	195
Bond on appeal	399	196
Clerk's certificate	401	197

1 The United States of America to the City of Detroit, greeting:

You are hereby cited and admonished to be and appear at a Supreme Court of the United States, to be holden at Washington on the second Monday of October next, pursuant to an allowance of appeal filed in the clerk's office of the Circuit Court of the United States for the eastern district of Michigan, in equity, wherein Robert C. Phillips, Eugene Robinson and Jesse H. Farwell are appellants, and you are appellee, to show cause, if any there be, why the decree rendered against said appellants, as in said allowance of appeal mentioned, should not be corrected, and why speedy justice should not be done to the parties in that behalf.

Witness the Honorable Morrison R. Waite, chief justice of the Supreme Court of the United States, this first day of June, A. D. 1881.

HENRY B. BROWN,
District Judge.

Service accepted June 1, 1881.

F. A. BAKER,
Sol'r for Def'ts.

(Endorsed:) 2039; in the Supreme Court of the United States; Robert C. Phillips et al., compl'ts & appellants, *vs.* The City of Detroit, def't & appellee; citation; filed in the clerk's office June 1, 1871, A. Mandell, clerk.

2 *Bill of Complaint.*

Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Eugene Robinson and Jesse H. Farwell
vs.
The City of Detroit.
} Bill in equity.

To the honorable judges of the Circuit Court of the United States for the eastern district of Michigan:

Robert C. Phillips, a citizen of the state of Ohio, and residing in Cincinnati, in said state, and Eugene Robinson and Jesse H. Farwell, citizens of the state of Michigan, and residing at Detroit, in said state, bring this their bill of complaint against the city of Detroit, a corporation created under and by virtue of the laws of the state of Michigan, and thereupon your orators complain and say—

First. That Robert C. Phillips was the original and first inventor of an improvement in wooden pavements, fully described in the letters patent hereinafter mentioned, and which had not been known or used before his said invention, and which was not at the time of his

application for a patent as hereinafter mentioned in public use or on sale with his consent or allowance.

3 *Second.* And your orators, on information and belief, further show into your honors that said Robert C. Phillips, being as aforesaid the first inventor and discoverer of said improvement, and being also a citizen of the United States, did, on December 5th, 1871, upon due application therefor, obtain letters patent of the United States for said invention in due form of law, under the seal of the patent office of the United States, signed by the secretary of the interior, and countersigned by the commissioner of patents of the United States, bearing date the day and year last aforesaid, whereby there was granted and secured to Robert C. Phillips, his heirs, administrators or assigns, or intended so to be, for the term of seventeen years from and after the date of said letters patent, the full and exclusive right and liberty of making, constructing, using and vending to others to be used the said invention and improvement as set forth in said letters patent, and by virtue whereof he became the sole owner of all the rights and privileges granted and secured, or intended to be granted and secured, in and by said letters patent.

Third. And your orators further show unto your honors that on or about the 25th day of September, A. D. 1874, the said Robert C. Phillips, by an instrument of that date, granted to the said Eugene Robinson and Jesse H. Farwell, as partners, the exclusive right to our said invention, in the state of Michigan, for a term of ten years from August 1st, 1874; which writing or a duly-authenticated copy thereof is ready in court to be produced.

4 *Fourth.* And your orators further show unto your honors that at a stated term of the United States Circuit Court in and for the southern district of Ohio a bill in equity was filed by your orator, Robert C. Phillips, against the city of Cincinnati, in the state of Ohio, a corporation duly organized under the laws thereof, for infringement of the aforesaid letters patent granted to said Phillips; that the said defendant, the city of Cincinnati, by its answer in said cause, denied the validity of said letters patent, alleging that the improvement therein described and claimed had been known and used by others before the invention thereof by the said R. C. Phillips; that testimony was taken in said cause on the part of both parties thereto; that the said cause came before the said court on or about the 1st day of December, A. D. 1874, for final hearing on the pleadings and proofs, and that after argument by counsel the opinion of the court was delivered, sustaining the validity of said letters patent, and a decree was entered in said cause, a copy whereof is hereto annexed, marked Exhibit A.

Fifth. Your orators further say that on or about the 18th day of May, 1875, at a stated term of the Circuit Court of the United States for the district of Kentucky, upon a like bill of complaint against the city of Covington, a corporation in said district duly organized under the laws of the state of Kentucky, the said plaintiff recovered

a decree against the said city of Covington for infringement
5 of the aforesaid letters patent, a copy of which decree is hereto annexed and made a part hereof, marked Exhibit B.

Sixth. And your orators further show unto your honors that by virtue of the promises your orators became, and now are, the sole and exclusive owners of said letters patent, and the inventions and improvements described therein, and of all the rights and privileges granted and secured, or intended to be granted and secured thereby. And that since they became the owners thereof, as aforesaid, they have invested and expended large sums of money, and they have been to great trouble in and about said inventions, and for the purpose of carrying on the business of manufacturing wooden pavements, and making the same profitable to themselves and useful to the public; and that said invention has been and is of great advantage, and that the public have generally acknowledged and acquiesced in the aforesaid rights of your orators; and your orators believe that they will realize and receive large gains and profits therefrom if infringements by said defendants and their confederates shall be prevented.

Seventh. Yet the said defendants, well knowing the premises, and the rights secured to your orators aforesaid, but contriving to injure your orators, and to deprive them of the benefits and advantages which might and otherwise would accrue unto them from said invention, after the issuing of the letters patent aforesaid, and before the commencement of this suit, did, as your orators are informed and believe, without the license or allowance, and against the will
6 of your orators, and in violation of their rights, and in infringement of the aforesaid letters patent, unlawfully, and in defiance of the rights of your orators, make, construct, use, and vend to others, to be used, the said invention, and did make, construct, and use pavements made according to and employing and containing said invention; and that they still continue so to do, and that they are threatening to make the aforesaid pavements in large quantities, and to use the same.

All in defiance of the rights acquired by and secured to your orators aforesaid, and to their great and irreparable loss and injury, and by which they have been and still are being deprived of great gains and profits which they might and otherwise would have obtained, but which have been received and enjoyed, and are being received and enjoyed by the said defendants, by and through their aforesaid unlawful acts and doings.

Eighth. And your orators further show unto your honors, on information and belief, that said defendants have made and used large quantities of said improvements, and have made and realized large profits and advantages therefrom, but to what extent and how much exactly your orators do not know, and pray a discovery thereof. And your orators say that the use of the said invention by said defendants, and their preparation for and avowed determination to continue the same, and their other aforesaid unlawful acts, in disre-

7 gard and defiance of the rights of your orators, have the effect to and do encourage and induce others to venture to infringe said patent in disregard of your orator's rights.

Ninth. And your orators further show unto your honors that they have caused notice to be given to said defendants of said infringements and of the rights of your orators in the premises, and requested them to desist and refrain therefrom; but they have disregarded said notice, and refused to desist from said infringements, and still continue to make and use said pavement.

Tenth. And forasmuch as your orators can have no adequate relief except in this court, to the end, therefore, that the said defendants may, if they can, show why your orators should not have the relief hereby prayed, and may, according to their best and utmost knowledge, remembrance, information, and belief, full, true, direct, and perfect answers make to the premises, and to all the several matters hereinbefore stated and charged, as fully and particularly as if severally and separately interrogated as to each and every of said matters, and may be compelled to account for and pay to your orators the profits by them acquired and the damages suffered by your orators from the aforesaid unlawful acts.

11th. And your orators pray that said defendants, the city of Detroit, their servants, agents, attorneys, and workmen, and each and every of them, may be restrained and enjoined provisionally and perpetually, by the order and injunction of this honorable

8 court, from directly or indirectly making, constructing, using, vending, delivering, working, or putting into practice or use, or in any wise counterfeiting or imitating the said invention, or any part thereof, or any wooden pavements made in accordance therewith, or like or similar to those which they have heretofore made; and that the said defendants may be decreed to pay the costs of this suit; and that your orators may have such further relief as to this honorable court shall seem meet and as shall be agreeable to equity.

May it please your honors to grant unto your orators the writ of injunction, as well provisional as perpetual, issuing out of and under the seal of this honorable court, commanding, enjoining, and restraining the said defendants, the city of Detroit, and their servants, agents, attorneys, and workmen, and each and every of them, as is hereinbefore in that behalf prayed.

May it please your honors to grant unto your orators the writ of subpœna issuing out of and under the seal of this honorable court, directed to the said defendants, the city of Detroit, commanding them by a certain day, and under a certain penalty, to be and appear in this honarable court, then and there to answer the premises, and to stand to and abide such order and decree as may be made against them

And your orators will ever pray, &c.

GEORGE V. N. LOTHROP,
Of Counsel for Compl'ts.

9 GEO. H. LOTHROP,
Comp'ts' Sol'r.

UNITED STATES OF AMERICA, }
Southern district of Ohio, county of Hamilton. }

On this 8th day of April, A. D. 1876, personally appeared Robert Phillips, a complainant above named, who, being by me duly affirmed, deposes and says that he has read the foregoing bill of complaint subscribed by him and knows the contents thereof, and that the same is true of his own knowledge, except so far as the matters therein stated and stated on information and belief, and as to those matters he believes it to be true.

And he further says that he verily believes that he, the said R. C. Phillips, is the original, true, and first inventor of the improvement in wooden pavement, described in the letters patent mentioned in the foregoing bill.

And further affiant saith not.

R. C. PHILLIPS.

Sworn to before me this 8th day of April, A. D. 1876.

WM. A. BOONE,
Notary Public, Ham. Co., Ohio.

10 UNITED STATES OF AMERICA, } *ss.*
Eastern district of Michigan, }

On this twenty-eight day of April, A. D. 1876, personally appeared before me Jesse H. Farwell, one of the complainants above named, who being by me duly sworn deposes and says that he has read the foregoing bill of complaint and knows the contents thereof, that the same is true of his own knowledge except as to the matters therein stated on information and belief, and as to such matters he believes it to be true.

JESSE H. FARWELL.

Subscribed and sworn to before me this 28th day of April, A. D. 1876.

ADDISON MANDELL,
Comm'r of Circuit Court U. S. east. dis'ct of Mich.

Exhibit A.

At a stated term of the Circuit Court of the United States for the sixth judicial circuit and southern district of Ohio, begun and held at the court-house, in the city of Cincinnati, on the first Tuesday of October, being the sixth day of that month, in the year of our Lord one thousand eight hundred and seventy-four, and of the in-
11 dependence of the United States of America, the ninety-ninth.

Present—the Honorable H. H. Emmons and the Honorable Philip B. Swing, judges of said court. Among the proceedings had were the following, to wit:

R. C. Phillips
vs.
The City of Cincinnati. } 1664.

This cause having been brought to final hearing upon the pleadings and proofs, and counsel for the parties respectfully having been heard thereon, and the court being fully advised in the premises, it is found and hereby ordered, adjudged, and decreed that the letters patent of the United States granted to complainant, as set forth in his bill in this cause, are good and valid, and that the complainant was the first inventor of the invention in said letters patent described, and that the title thereto is vested in the complainant. And it is further ordered, adjudged, and decreed that the respondent has disturbed, violated, and infringed the exclusive right of the complainant under the said letters patent, as in the said bill set forth and specified.

And it is further ordered, adjudged, and decreed that the complainant do recover of the defendant the profits, gains, and savings and advantages made by the said defendant in consequence
12 of the said infringement and violation of the exclusive right of the complainant under the said letter patent since the expiration of the term of office of the complainant as engineer of the city of Cincinnati, prior damages and profits having been waived by the complainant, together with the damages has sustained by said infringement. And it is further ordered, adjudged, and decreed that the cause be referred to Rankin D. Jones, as master, to ascertain and take and state and report to the court an account of the gains, profits, savings, and advantages which the said defendant has waived, and which have arisen or accrued to the defendant from the said infringement of the exclusive rights of the complainant under the said letters patent, as well as of the damages the complainant has sustained thereby. And it is further ordered that the complainant on said examination have the right to have produced the books of the respondent, and of the vouchers and documents in respondent's possession, before the said Rankin D. Jones, master, from time to time as the said master shall direct. And it is further ordered, adjudged, and decreed that the defendants pay the costs in this cause to be taxed by the clerk. And the cause is continued until the coming in of the master's report.

December 11th, 1874.

13 UNITED STATES OF AMERICA, } *ss.*
Southern district of Ohio,

I, Thomas Ambrose, clerk of the Circuit Court of the United States for the southern district of Ohio, hereby certify the foregoing decree in the case of R. C. Phillips *vs.* The City of Cincinnati to be truly and correctly copied from the journal of said court as the same is kept in this office.

In testimony whereof I have hereunto set my hand and affixed the

seal of said court at Cincinnati, this 12th day of February, A. D. 1875, and in the 99th year of the independence of the United States of America.

Attest: THO'S AMBROSE,
Clerk U. S. Cir. C't, S. D. O.

14 *Exhibit B.*

Proceedings of the Circuit Court of the United States for the district of Kentucky, at a regular term begun and held at the Federal Court Hall in the city of Covington, on Monday, May 10th, A. D. 1876.

Present: Hon. Bland Ballard, judge of the United States for the district of Kentucky.

R. C. Phillips
vs.
City of Covington.

And on a day of said term, continued and filed, to wit, on Saturday, May 15th, A. D. 1875, the following decree was entered, to wit:

R. C. Phillips
vs.
City of Covington. } Decree.

This cause came on to be heard upon the bill of complaint and exhibits, and the defendant having failed to answer, it is ordered, adjudged, and decreed that the bill be taken as confessed; and thereupon it is found, and hereby ordered and adjudged, that the letters patent issued to Robert C. Phillips, dated December
15 5th, 1871, and numbered 121544, and set forth in the bill of complaint, are good and valid, and the title hereto is in the complainant.

It is further found, adjudged, and decreed that the defendant has violated and infringed the exclusive right of the complainant under the said letters patent as in the said bill set forth.

It is further ordered and adjudged that the complainant recover of the defendant the profits, gains, savings, and advantages made by the defendant in consequence of said infringement, as well as the damages the complainant has sustained, which by consent of parties *as* fixed by the court at the sum of one thousand dollars, together with the costs in this suit to be dated.

It is further ordered, adjudged, and decreed that a perpetual injunction be granted in this suit against the said defendant according to the prayer of the bill.

Circuit Court of the United States for the district of Kentucky (at Covington.)

R. C. Phillips
vs.
City of Covington.

I, Henry Bostwick, clerk of the Circuit Court of the United States for the district of Kentucky, (at Covington,) hereby certify
16 that the foregoing two (2) pages contain a true copy of the decree in the above entitled cause, as the same is now of record in my office.

In testimony whereof I have hereunto subscribed my name and affixed the seal of said court this 24th day of April, A. D. 1876, and of our independence the 100th year.

[SEAL.] H. BOSTWICK,
C. C. C., K. D.

(Endorsed:) I hereby acknowledge myself security for all costs in the within case for which complainants may become liable. (Signed) Jesse H. Farwell. Filed April 28, 1876, Jno. Graves, dep. cl'k.

17 *Subpœna.*

Circuit Court of the United States of America for the sixth circuit and eastern district of Michigan, sitting in chancery.

The President of the United States of America to the City of Detroit, a corporation created under and by virtue of the laws of the state of Michigan, which is a citizen of the state and resident of the eastern district of Michigan:

You are hereby commanded to be and appear in the Circuit Court of the United States of America for the sixth circuit and eastern district of Michigan, sitting in chancery, before the judges thereof, at the district court-room, in the city of Detroit, on the first Monday of June next ensuing, then and there to answer unto a bill of complaint exhibited against you as defendant by Robert C. Phillips, of Cincinnati, Ohio, and a citizen of the state of Ohio, and Eugene Robinson and Jesse H. Farwell, of Detroit, Michigan, who are citizens of the state of Michigan, for an infringement of patent under the patent laws of the United States, as complainant. And this you shall in nowise omit, under the penalty of one thousand dollars.

Witness the Hon. Morrison R. Waite, chief justice of the Supreme Court of the United States, this twenty-eighth day of April, in the year of our Lord one thousand eight hundred and seventy-six, and of the independence of the United States the one hundred and ——.

ADDISON MANDELL,
Clerk.

Memorandum.—The above-named defendant is required to enter its appearance in this suit with the clerk of this court, at his office

in the city of Detroit, on or before the day on which this writ of subpœnà is returnable, otherwise the bill of complaint in this cause will be taken *pro confesso* against said defendant.

ADDISON MANDELL,
Clerk.

18 EASTERN DISTRICT OF MICHIGAN, *ss.*

I hereby certify and return, that on the 28th day of April, A. D. 1876, I served the within writ on Alex. Lewis, mayor of the city of Detroit, one of the defendant within named, at Detroit, in said district, by delivering to him personally a true copy thereof, also exhibiting this writ with the seal of the court impressed thereon.

JOS. K. BENNET,
U. S. Marshal.

Service, 2.00; 1 cop., 50; 1 mile's travel, 06—fees, 2.56.

(Endorsed:) No. 2039; Circuit Court of the United States for the sixth circuit and eastern district of Michigan, in chancery; Robert C. Phillips et al., compl'ts, *vs.* The City of Detroit, def't; subpœna; returned and filed June 3, 1876; (sig'd) A. Mandell, cl'k; Stallo & Kittredge, complainants' solicitors.

19 *Defendant's Appearance.*—Filed May 30th, 1876.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Eugene Robinson, & Jesse H. Farwell } In
vs. } equity.
The City of Detroit. }

On motion of D. C. Holbrook, solicitor for the defendant, its appearance in this cause is now entered, and the defendant requires service of a copy of the bill filed in this cause.

D. C. HOLBROOK,
May 30, 1876. *For Def't.*

(Endorsed:) Please enter the within; filed May 30, '76; A. Mandell, cl'k.

20 *Answer of Defendant.*—Filed June 29th, 1876.

In the Circuit Court for the United States for the eastern district of Michigan.

Robert C. Phillips, Eugene Robinson, and Jesse H. Farwell } In
vs. } equity.
The City of Detroit. }

The answer of the defendant to the bill in this cause.

This defendant, now and at all times hereafter saving and reserving unto itself all benefit and advantage of exception which can or may be had or taken to the many errors and uncertainties and other imperfections in said bill of complaint contained, for answer thereunto, or with such parts thereof as this defendant is advised is or are material or necessary for it to make answer unto, answering, saith to the paragraph of said bill numbered—

First. This defendant denies that said Robert C. Phillips was the original and first inventor of an improvement in wooden pavements described in the letters patent referred to, and this defendant alleges that said pretended improvement had been known and used before said pretended invention by said Phillips; that at the time of his application for a patent, and for years before, the same was in
21 public use and on sale by other persons, and he well knew the same.

Second. This defendant admits that said Phillips did obtain, and there was granted to him, the letters patent in due form of law as set forth in said paragraph, but this defendant denies that there was granted and secured to him and his heirs, &c., any such rights as is or are alleged for the constructing, using, and vending to others to be used, the said pretended inventions and improvements, nor did said Phillips become thereby the sole owner of the rights and privileges purporting to be granted or intended to be granted and secured in and by said letters patent.

Third. This defendant admits that said Phillips did make and deliver to said other complainants, Robinson and Farwell, an instrument of the date stated and giving them some rights, if any there are under said patent, but this defendant does not admit that it was a right to use merely as stated in this third paragraph, and this defendant denies that it could give said Robinson and Farwell any exclusive rights to use said invention as alleged.

Fourth. This defendant has no knowledge, except by information, that said Phillips filed his bill and obtained a decree against the city of Cincinnati, as stated in said fourth paragraph.

22 Fifth. This defendant makes a like answer to this the fifth paragraph in relation to the suit against the city of Covington as is above made to the fourth paragraph, but it claims and alleges that such decrees were not obtained on the merits of the case.

Sixth. This defendant, upon information and belief, denies to be true the matters stated in this the sixth paragraph, and leaves the complainants to make such proofs thereof as may be proper.

Seventh. This defendant, denying to be true any intent to injure the said complainants and deprive them of any benefits to which they may be entitled, if any, admits that at various times it has entered into contract and caused to be constructed and used and are now constructing and using the said pretended invention and pavement, as described in said letters patent and the specification attached thereto. This defendant denies, however, that such construction and use is in defiance of the rights of said complainants, and to their loss

or depreciation of profits, as this defendant is advised, and submits the said complainant has no right under said patent.

Eighth. This defendant admits that it has caused said pavement to be laid, but denies that it has made and realized large profits and advantages therefrom, and by its acts have the effect to encourage and induce others to venture to infringe said patent
23 and disregard the rights of said complainants.

Ninth. This defendant admits that some kind of a notice of the purport stated in this paragraph was given to this defendant, and that this defendant has disregarded the same.

Tenth. This defendant cannot now set forth to what extent it has caused said pavements to be laid; that it has caused several different kinds of pavements to be laid, and which are patented to other parties, similar in construction to that claimed by complainants, and which are alleged by complainants to be infringements of the said Phillips' patent, and said other patentees have also claimed and do claim that they only are the true and sole inventors of said pavement so claimed by said complainants, and that any pavement laid in accordance with said patent of said Phillips is an infringement of such other patents, and whether any and what and which of said pavements are really infringements of the patent of said Phillips this defendant cannot state.

Eleventh. This defendant, therefore, as and for a defence to the complainants' said bill, further answering, says: It denies, upon information and belief, that said complainant Phillips was the inventor or discoverer of any part of the supposed improvement, either as to a separate part thereof or as a combination, as described; that it was a fact, and well known to said Phillips years prior to and during the
24 time of his said application, that such a pavement as he claims to have invented was and had been in actual use for years before then; that it had been described in public papers; that as early as the year 1844, the entire pavement claimed to be invented by said Phillips was so well known, to said Phillips in particular, and to the public generally, to such an extent that there could be no invention thereof by any person, and the said patent granted to said Phillips was fraudulently issued and contrary to law.

Twelfth. That the said Phillips, in and by the specification annexed to said patent and the claim made therein, hath not sufficiently stated what his supposed invention consisted of, and particularly in this, that he has not stated what part thereof was new and what was before known, nor does he specify therein what he claims, whether any part thereof is new nor a combination as new, of what was before well known.

Thirteenth. This defendant, further answering upon information and belief, says: Long prior to any supposed or alleged invention by complainant Phillips the same, as claimed by him, was fully published and described in substance and effect in letters patent as follows:

1st. In the English patent, No. 10,187, issued to Peter Armand

de Comte de Fontainemoreau, May 15, 1844, for "a new and
25 improved method of paving and covering roads and other ways and surfaces," fully described at length in a bound volume of the library of the patent office of the United States.

2d. In the 7th volume of English Law Reports, known and called Manning and Granger's Reports, which contains a report of a case entitled Stead vs. Williams, page 818, and refers to and described several wooden pavements and descriptions thereof substantially the same as that claimed by said Phillips.

3d. The English patent, No. 8940, granted to Osborn Reynolds, dated April 27th, 1840, for "improvements in paving streets, roads, and ways," fully described at length in a bound volume of the library of the patent office of the United States.

4th. The letters patent numbered 85,814, dated January 12th, 1869, issued by the commissioner of patents of the United States to Charles Guidet.

5th. The letters patent numbered 85,814, dated February 25th, 1868, issued by the commissioner of patents of the United States to Henry M. Stowe.

5th. The application of Henry F. Williams for a patent, filed in the United States patent office, Washington, June 10th, 1868, for an "improvement in wooden pavements."

6th. Letters patent granted to Gardner Warren by the commissioner of patents, assigned on the day of October, 1869.

26 7th. The English patent of Lindsay, No. 5185, of 1825.

8th. The English patent granted to Marcarthy, number 5287, granted in 1825.

9th. The English patent granted to Parkin, No. 8026, in 1839.

That there are many other patents issued and descriptions published in England and the United States prior to the pretended invention of said Phillips which cover and include the entire improvement claimed by said Phillips, the particulars whereof this defendant will, being permitted by this court, set forth in amendment to this answer.

Fourteenth. This defendant, further answering, says it is informed and believes and thereupon alleges that the said pretended improvement claimed by said Phillips was well known by many persons and by whom this defendant will prove the same, and was in public use in many places for at least five years prior to the application by said Phillips for said patent, to wit:

10th. In the city of Cincinnati, Ohio, and all other cities of the United States where cobble-stone and other stone pavements were laid and used for twenty and more years prior to 1870, and known to one Robert C. Phillips, William H. Bristol, Frank Kirchner, Charles Fortz and P. C. Bonte, of Cincinnati, Ohio.

11th. In the city of Detroit, Michigan, by Alanson Shelby, John Owen, Jacob S. Farrand, Michael Henderson, John L. King,
27 Harvey King, Alexander Chapeton, Ichabod Goodrich and many others of Detroit, Michigan.

12th. In the city of Buffalo, New York, by William and Isaac Hollwray, of Buffalo, N. Y., and Frank Kirchner, of Cincinnati, Ohio.

13th. In the city of New Orleans by Charles Fotz, of Cincinnati, Ohio.

14th. In the city of Boston, Mass., by Joseph R. Green, late of the city of New York; Samuel H. Fawcett, of Cambridge, Mass.; Charles Spencer, Jonathan Davis, Samuel S. Perkins, of Boston, Mass., and Samuel S. Leitch, of Malden, Mass.

Also other cities and places in the United States of which this defendant is not now able to give the names and persons by whom this defendant will show the same, but prays leave to insert the same by amendment hereto.

Fifteenth. This defendant, further answering, and as an objection and exception to the said bill in the manner and form of the same and of the relief sought thereby, and claiming the same rights thereby as though it had specially demurred to said bill, therefore says that it impliedly appears by said bill and will appear on the hearing that said bill is multifarious, in this: that the said complainants Robinson & Farwell were at the time of the filing of said bill, and had been long prior thereto, the sole and exclusive owners of the rights
28 to construct, sell and use the said improvement set forth in said bill in and for the state of Michigan, and to all damages for the infringement claimed in and by said bill, and that said complainant Phillips is in no way interested in said damages or money claimed in said bill.

Sixteenth. That the said Robinson & Farwell themselves laid said improvements under and by contracts with this defendant for the laying thereof, and authorized the same to be laid and used by this defendant.

And this defendant denies all unlawful combination and confederacy charged in said bill, and prays that the same may be dismissed with costs.

The said defendant hereby affixes its corporate seal hereto.

CITY OF DETROIT,
[L. S.] By E. J. GARFIELD,
Controller.
Attest: CHAS. H. BORGMAN,
City Clerk.

(Endorsed:) Filed June 28th, '76. A. Mandell, clk.

29 *Replication.*—Filed July 5th, 1876.

The Circuit Court of the United States for the eastern district of Michigan. In chancery.

The replication of Robert C. Phillips, Eugene Robinson, & Jesse H. Farwell, complainants, to the answer of the City of Detroit, defendant: These repliants, saving and reserving to themselves now and

at all times hereafter, all and all manner of benefit and advantage of exception which may be taken to the manifold insufficiencies of the said answer, for replication thereunto say that they will aver, maintain, and prove their bill of complaint to be true, certain, and sufficient in the law to be answered unto; and that the said answer of said defendant is uncertain, untrue, and insufficient to be replied unto by these repliants without this, that any other matter or thing whatever in the said answer contained, material or effectual in the law to be replied unto, and not herein and hereby well and sufficiently replied unto, confessed and avoided, traversed or denied, is true; all which matters and things these repliants are and will be ready to aver, maintain, and prove as this honorable court shall direct, and humbly pray as in and by their said bill they have already prayed.

STALLO & KITTREDGE,
GEO. H. LOTHROP,
Solicitor for Complainants.

30 (Endorsed:) Filed July 5, 1876, at 11 a. m. (S'g'd) Jno. Graves, dep'y cl'k.

31 *Proof of service of notice of motion.*—Filed October 25th, 1876.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Eugene Robinson, & Jesse H. Farwell
vs.
The City of Detroit.
} In Equity.

Please take notice that on the second day of November, A. D. 1876, at ten o'clock in the forenoon of said day, or as soon thereafter as counsel can be heard, before Hon. Halmer H. Emmons, circuit judge, at his office in the city of Detroit, the undersigned will move for a preliminary injunction to restrain said defendant, its agents, servants, attorneys, and workmen, from making, constructing, using, vending, or in any way counterfeiting or imitating the invention of said Robert C. Phillips, as set forth and prayed for in the bill of complaint filed in this cause.

This motion is based upon the pleadings and proofs in this cause.

Detroit, October 25, 1876.

STALLO & KITTREDGE,
GEO. H. LOTHROP,
Sol'rs for Compl'ts.

To D. C. HOLBROOK,
32 *Sol'r for Def't.*

DETROIT, *Oct.* 24, 1876.

Due service of a copy notice admitted.

D. C. HOLBROOK,
Sol'r for Def't.

(Endorsed:) Filed Oct. 25, 1876. Jno. Graves, dep'y clerk.

33 *Note of Issue.*—Filed Oct. 21st, 1876.

In the Circuit Court of the United States for the eastern district of Michigan. In Equity.

Robert C. Phillips, Eugene Robinson, & Jesse H. Farwell
vs.
The City of Detroit.

To the Register of said Court:

Please place this cause upon the calender of said court for the next term thereof, for hearing upon pleadings & proofs, the counsel for defendant having consented thereto.

Yours, STALLO & KITTREDGE,
GEO. H. LOTHROP,
Sol'rs for Compl'ts.

Detroit Oct. 31st, 1876.

(Endorsed:) Filed Oct. 21, 1876; A. Mandell, cl'k.

34 *Stipulation.*—Filed Nov. 2d, 1876.

In the Circuit Court of the United States for the eastern district of Michigan. In Equity.

Robert C. Phillips, Eugene Robinson, & Jesse H. Farwell
vs.
The City of Detroit.

It is hereby stipulated and agreed by & between the parties to this cause that the patent of complainant Phillips, upon which this suit is brought, may be put in evidence in this cause by filing a certified copy thereof with the clerk of said court, and that the copies of the following patents, which are marked with the title of this cause and signed by the solicitors of the parties, may be put in evidence in this cause by filing the same with the clerk of said court, viz.:

Patents of Charles Guidet, Jan'y 12, 1869, No. 85,814.
Henry M. Stow, Feb'y 25, 1868, No. 74,862.
Gardner Warren, October 19, 1869, No. 96,062.
——— Parkins, April 9, 1839, No. 8026.
Osborne Reynolds, April 27, 1841, No. 8940.

Patents of ——— Lindsay, June 14, 1825, No. 5185.
David Stead, May 19, 1838, No. 7645.
35 Abner McCarthy, Nov. 10, 1825, No. 5287.
Fontainemoreau, May 15, 1844, No. 10,187.

Detroit, Oct. 30, 1876.

D. C. HOLBROOK,
Sol'r for Def't.
STALLO & KITTREDGE,
Per GEO. H. LOTHROP,
GEO. H. LOTHROP,
Sol'rs for Compl'ts.

(Endorsed:) Filed in clerk's office Nov. 2d, 1876; A. Mandell. cl'k.

36 *Amendment to Answer.*—Filed Dec. 28th, 1876.

In the Circuit Court of the United States for the eastern district of Michigan. In Equity.

Robert C. Phillips, Eugene Robinson, & Jesse H. Farwell }
vs.
The City of Detroit. }

Amendment notice to the answer of the defendant in this cause by adding to paragraph numbered "*fourteenth*" a subdivision numbered 15th, as follows:

15th. In the city of San Francisco, California, in the years 1867 & 1868 the said pretended improvement now laid on the Mission bay toll bridge, said way so called by Henry F. Witham, & was known to him, Charles D. Wheat, Robert P. Kelly, William Reed, and William Henry, all of San Francisco, in the state of California.

D. C. HOLBROOK,
Sol'r for Def't.

(Endorsed:) This amendment may be made; Dec., '76; Geo. H. Lothrop, sol'r for compl'ts; filed Dec. 28, 1876; A. Mandell, cl'k.

37 *Stipulation for Commission.*—Filed M'ch 12th, 1877.

In the Circuit Court of the United States for the eastern district of Michigan. In Equity.

Robert C. Phillips, Eugene Robinson, & Jesse H. Farwell }
vs.
The City of Detroit. }

The parties hereto consent that a commissioner issue out and under the seal of this court in this cause to E. V. Sutter, as commissioner, at San Francisco, California, to examine the witnesses named in the interrogations proposed in this cause. That all matters of *firm* in certifying and returning said depositions are waived, but all of said

evidence shall be subject to all proper objections as to competency and relevancy.

March 8, 1877.

D. C. HOLBROOK,
Sol'r for Def'ts.
STALLO & KITTREDGE,
Att'ys for Pl'ffs.

By W.

(Endorsed:) Filed March 12, '77; A. Mandell, cl'k.

38 *Order that bill be returned to files.*—Filed March 19th, 1877.

At a session of the Circuit Court of the United States for the eastern district of Michigan, sitting in equity, continued and held pursuant to adjournment at the court room in the city of Detroit, on the 19th day of March A. D. 1877.

Present—Hon. Henry B. Brown, district judge.

Robert C. Phillips, Eugene Robinson, and Jesse H. Farwell
vs.
The City of Detroit.

It appearing to the court that in pursuance of an order heretofore made in this cause, the bill filed therein has been removed from the files and loaned to George H. Lothrop, esq., solicitor for the complainant therein.—

It is ordered that the said bill be returned to the files forthwith, and D. C. Holbrook, esq., solicitor for said deponents, have leave to take the said bill from the files and retain the same for five days from and after the date of this order.

(Endorsed:) Entered and filed March 19, 1877: A. Mandell, clerk.

39 *Affidavit of Jesse H. Farwell.*—Filed July 2d, 1877.

In the Circuit Court of the United States for the eastern district of Michigan. In Equity.

Robert C. Phillips, Eugene Robinson, and Jesse H. Farwell
vs.
The City of Detroit.

EASTERN DISTRICT OF MICH., COUNTY OF WAYNE, *ss.*

Jesse H. Farwell being duly sworn, deposes and says that he is one of the complainants in this cause. That he and complainant Robinson are exclusive licensees, for the state of Michigan, of the patent on which this suit is brought, and have at large expense provided materials and appliances for laying the pavement covered by said patent; that said defendant has ordered a large amount of said pavement laid, and is about to enter into contracts

for the laying of the same with parties other than the complainants in this cause.

JESSE H. FARWELL.

Sworn to and subscribed before me this 27th day of June, A. D. 1877.

D. BETHUNE DUFFIELD,
Notary Public, Wayne Co., Mich.

40 (Endorsed:) Filed July 2d, 1877; John Graves, dep. cl'k.

41 *Order for preliminary injunction.*—Filed July 2d, 1877.

At a session of the Circuit Court of the United States for the eastern district of Michigan, sitting in equity, continued and held pursuant to adjournment at the court room in the city of Detroit, on the 2nd day of July, A. D. 1877.

Present—Hon. Henry B. Brown, district judge.

Robert C. Phillips, Eugene Robinson, & Jesse H. Farwell
vs.
The City of Detroit. } In equity.

On reading and filing the bill of complaint and exhibits and answer in this cause, and the affidavit of Jesse H. Farwell, and on motion of Geo. H. Lothrop, solicitor for complainants, it is ordered that a preliminary injunction be issued in said cause according to the prayer of said bill; provided that said injunction shall not in any way affect the paving of any street for which the contract has already been let by said defendant.

(Endorsed:) Filed July 2d, 1877; A. Mandell, cl'k.

42 *Order modifying order for preliminary injunction.*

At a session of the Circuit Court of the United States for the eastern district of Michigan, continued and held pursuant to adjournment at the district court room in the city of Detroit, on Tuesday, the third day of July, in the year one thousand eight hundred and seventy-seven.

Present—Hon. Henry B. Brown, district judge.

Robert C. Phillips, Jesse H. Farwell, and Eugene Robinson, comp'ts,
vs.
The City of Detroit, def'd't. } In equity. 2039.

On reading and filing stipulation in this cause, and on motion of Geo. H. Lothrop, of counsel for complainant, it is ordered that the order for preliminary injunction entered in this cause on the second day of July instant, and the injunction issued thereunder, be so

modified that said injunction shall extend to Michigan avenue, in the city of Detroit, west of the west line of the Forsyth farm.

43 *Second amendment to answer.*—Filed July 11th, 1877.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Eugene Robinson & Jesse H. Farwell
vs.
The City of Detroit.

Amendment number two to the answer of the defendant in this cause, to wit:

Insert in paragraph numbered thirteen the following further subdivision thereof, to wit:

10. The English patent to David Stead dated April 23rd, 1839, and enrolled August 23rd, 1839, for an improved method ofmaking or paving streets and highways, and

11. The English patent No. 8657 to Thomas Wood the younger, dated October 7th, 1840, and enrolled April 2nd, 1841, for an improvement in paving streets.

12. The English patent No. 9737 to Henry Auston, dated May 25th, 1843, and enrolled November 25th, 1843, for improvement in wood pavements, flooring, &c.

13. The English patent No. 943 to Sir John Scott Lillie, dated April 14th, 1860, and enrolled October 1st, 1860, for an improvement in carriage-ways.

14. And the specifications and drawings of each of said above described English patents were published and known and described to the public and were *known and described to the public* and were contained in printed books and volumes in the library of the department of the interior and the library of the patent office of the United States in the city of Washington, D. C., for at least three years prior to the application of said Phillips for said patents, and the said alleged improvement and invention of said Phillips were so known, published, described and contained in said books and library.

44

Insert in paragraph number sixteen the following further subdivisions thereof, to wit:

16th. In the city of Chicago, Illinois, in the years 1864 and 1865, by and known by James K. Thompson, Thomas Mackin and Henry L. Bristol of Chicago, Illinois.

17th. In the city of Montreal, Canada, in the year 1841, and known by Edwin Pullam and John Flanagan of Detroit, Michigan.

THE CITY OF DETROIT,
D. C. HOLBROOK,
Sol'r for Def't.

(Endorsed:) Filed July 11, 1877. Jno. Graves, dep'y clerk.

45 *Stipulation.*—Filed July 23d, 1877.

In the Circuit Court of the United States for the eastern district of Michigan.—In equity.

Robert C. Phillips, Eugene Robinson, and Jesse H. Farwell
vs.
The City of Detroit.

It is hereby stipulated and agreed by the complainants that so much of Fort street, in said city of Detroit, as lies between the west line of Griswold street and the west line of Fifth street may be excepted from the preliminary injunction heretofore granted in this cause.

Detroit, July 23d, 1877.

GEO. H. LOTHROP,
Sol'r for Compl'ts.
STALLO & KITTREDGE,
of Counsel.

(Endorsed:) Filed July 23d, '77. A. Mandell, cl'k.

46 *Notice of application to file 2d amendment to answer.*—Filed Sept. 19th, 1877.

Circuit Court U. S.—In equity.

Robert C. Phillips et al.
vs.
The City of Detroit.

Service of a copy of the 2d amendment to the answer in this cause and notice of application for leave to file the same.

GEO. H. LOTHROP,
Sol'r for Compl'ts.

Sept. 19, 1877.

(Endorsed:) Filed Sept. 19, 1877. Jno. Graves, dep'y cl'k.

Order that defendant have leave to file 2d amendment.

47 At a session of the Circuit Court of the United States for the eastern district of Michigan, continued and held pursuant to adjournment, at the district court room in the city of Detroit, on Wednesday, the nineteenth day of September, in the year one thousand eight hundred and seventy-seven.

Present—Honorable Henry B. Brown, district judge.

Robert C. Phillips, Eugene Robinson and Jesse H. Farwell, compl'ts,
vs.
The City of Detroit, def't.
In equity. 2039.

On motion of Mr. Holbrook, solicitor for defendant, it is ordered

that defendant have leave to file second amendment to defendant's answer.

48 *Motion & Notice of Commitment for Contempt.*—Filed Sept. 19th, 1877.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell, Eugene Robinson } In equity.
vs.
The City of Detroit. }

To Nicol Mitchell, William Purcell, & Alexander Chapoton, composing the board of public works of said city of Detroit:

Please take notice that on Monday, the first day of October, at the opening of said court in the forenoon of said day, or as soon thereafter as counsel can be heard, I shall move the court that you stand committed for contempt in violating the preliminary injunction granted in this cause. Said motion will be based upon the files in this cause and upon the affidavit of Jesse H. Farwell and the exhibits attached thereto, copies of which are herewith served on you.

Yours, GEO. H. LOTHROP,
Sol'r for Compl'ts.

Detroit, Sept. 19, 1877.

49 United States of America. In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell, & Eugene Robinson } In equity.
vs.
The City of Detroit. }

And now come the said complainants and move the court that Nicol Mitchell, William Purcell, and Alexander Chapoton, who compose the board of public works of said city of Detroit, stand committed for contempt in violating the preliminary injunction heretofore granted in this cause.

This motion is based on the files in this cause and on the affidavit of Jesse H. Farwell, hereto annexed, and the exhibit annexed to said affidavit.

GEO. H. LOTHROP,
Sol'r for Compl'ts.

United States of America. In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell, & Eugene Robinson
vs.
The City of Detroit. } In equity.

50 EASTERN DISTRICT OF MICHIGAN, } *ss.*
County of Wayne, }

Jesse H. Farwell, of Detroit, being duly sworn, deposes and says that he is one of the complainants in this cause; that on the second day of July, A. D. 1877, a preliminary injunction was granted in this cause, which was served on Alexander Lewis, the mayor of said city of Detroit, on the third day of July, A. D. 1877.

That the board of public works of the city of Detroit is composed of Nicoll Mitchell, William Purcell, and Alexander Chapoton, who are officers and agents of said city of Detroit, and have sole control and superintendence of all paving done in said city.

That prior to the sixteenth day of August, A. D. 1877, said Nicoll Mitchell, William Purcell, and Alexander Chapoton, as such board board of public works, executed, in behalf of said city of Detroit, a contract with the firm of Ledbeter and Stewart for repaving Jefferson avenue from Cass street to Second street, in said Detroit, a copy of the contract and specifications of which are hereto annexed, marked Exhibit X, and have since executed other contracts with various parties, with conditions precisely similar to those of Exhibit X.

That by the terms of all of said contracts all pavement laid thereunder is at all times subject to the control of said board of
51 public works, and no materials can be used or work done which does not meet their approval.

That under said contracts the contractors have, with the knowledge and consent of said board of public works, laid since said sixteenth day of August, 1877, and are now laying, large quantities of pavement in said city of Detroit, which is an infringement of the patent of Robert C. Phillips, upon which this suit is brought, and is laid in violation of said preliminary injunction.

That all the pavement laid under said contracts consist of a foundation of sand or gravel, upon which are laid cedar blocks in their natural state, except that the bark is stripped off, and that a small piece—from one-half inch to one and one-half inches in width—is split off from one side of some of said blocks, but not from all, and the spaces between said blocks are filled with sand and gravel.

That deponent has been for many years, and now is, a practical and expert pavier, and is well acquainted with the specification and claim of the patent on which this suit is brought, and that in deponent's opinion the pavement so laid under said contract is a mere colorable evasion of and an infringement upon said patent.

52 That said board of public works have been repeatedly notified by deponent that they were violating said preliminary injunction, but have paid no attention thereto.

And deponent further says that the two cedar blocks marked with his name by him were taken by him from a piece of pavement actually laid on Monroe & Woodward avenues, in said Detroit, under a contract precisely similar in its terms to Exhibit X, executed subsequent to the granting and serving of said preliminary injunction.

JESSE H. FARWELL.

Sworn to and subscribed before me this 19th day of September, A. D. 1877.

GEO. B. REMICK,
Notary Public, Wayne co., Mich.

53 *Exhibit X.*

Board of Public Works, 1877.—Specifications for Combination Pavements.

The pavement to be composed of cedar blocks, cut the length specified, and placed upon a bed of sand or gravel, laid in that part of the street known as the driveway, and in connection with stone pavement, composed of many desired stone, for the sides and gutters of the said street, as hereinafter described, the width of each kind to be varied and determined upon to suit the different widths of streets. The two kinds of pavement to be laid across the street at the same time, forming a combined pavement of wood and stone, and to be known as "combination pavement."

Grading.—Said street to be graded to its established grade under the direction of the board of public works, and must be excavated to such a depth below the true grade as the board may deem necessary for the purpose of receiving ballast for the roadway. The bottom of excavation when completed shall conform to the sec-
54 tion or crown of the street as furnished by the city engineer.

If there are places in the street which are not firm or properly settled, caused by trenching for connections of sewers, gas, or water pipes, it must be taken out, refilled, and pounded to make it solid. If the contractor shall excavate deeper than the grade specified by the city engineer, then the back filling shall be filled with bank sand and gravel. The surplus earth, if any, must be disposed of by the contractor, the board reserving the right to direct the contractor to remove any earth it may require for the purpose of filling up any low lots, alleys, and sidewalks to the proper grade within the assessment district.

Ballast.—A bed of sand and gravel, not less than (6) inches in depth, shall be placed upon the road-bed previously prepared to receive it, and shall be evenly spread and rounded to the shape of the street, and shall be well rolled at least one block at the time before being paved, with a roller weighing at least 2,400 lbs., after which the same shall be well rolled with a hand-roller weighing not less than 800 lbs. The roller to be used before paving to keep the bed of the street smooth. Whenever sand or gravel is specified it must

be equal in quality to the specimens in the board of public
55 works office and approved by the board.

Curbstone.—Curbstone shall be of the best Medina, Lake Superior or Berea sandstone as the board shall direct, and bids shall be received for each separately, not less than thirty (30) inches in length, of a depth of eighteen (18) inches, and four (4) inches in thickness, and show a fair face above the paving. It must be set in a bed of bank sand and gravel, and incline one-half ($\frac{1}{2}$) inch from the street, and the top dressed to the bevel of the sidewalk. The joints dressed to the depth of twelve (12) inches, and the back filling to be of not less than four (4) inches of bank sand and gravel, and firmly pounded. At all corners or intersections of streets, the curb shall be set with a circle of two (2) feet radius or otherwise, as the board may direct. The circle stone to be eighteen (18) inches in depth, and faced on the ends not less than fourteen (14) inches. In case the curbstones shall come above the natural surface of the ground, they must be backed with earth flush with the top and at least three (3) feet in width.

The setting of the curbstones must be done by experienced workmen, and will not be accepted unless they are set to the true line and grade.

Blocks.—Blocks (stripped of the bark) of irregular or octagon shape sawed from cedar timber. All blocks shall be cut
56 from good, sound, live timber, free from loose or rotten knots, or other defects, and shall measure no more than ten (10) nor less than four (4) square inches on top, and not less than seven (7) inches in depth, and so placed as to make as near as possible the spaces of uniform size.

Before the spaces between the blocks are filled with gravel, the blocks shall be pounded with a pounder weighing not less than eighty (80) pounds, and to be twelve (12) inches in diameter, flat at the bottom, and the blocks brought to a level surface.

No teaming shall be permitted over the pavement until the spaces are filled in with gravel.

Spaces.—The spaces between the blocks to be filled with screened gravel, free from sand or dust, and swept off with a coarse broom, the blocks then pounded with a pounder weighing not less than eighty (80) pounds, and to be twelve (12) inches in diameter, flat at the bottom, and the blocks brought to a level surface.

Top-dressing.—The cedar block pavement shall be left uncovered until the same is inspected by some person or persons authorized by the board, and when inspected and accepted the whole surface shall be covered over with cement, composed of hot coal tar two (2) parts and pitch one (1) part, boiled so at to exclude all moisture,
57 which cement shall be required to penetrate to the bottom of the blocks, and then covered with gravel and sand to the depth of three-fourths ($\frac{3}{4}$) of an inch.

Stone.—The paving stones must not be more than six (6) inches nor less than three (3) inches in thickness, and from six (6) to ten (10)

inches in length, and not more than eight (8) nor less than seven (7) inches deep, and must be faced on top. The quarry stone used in paving the sides of th estreet shall be equal in quality to specimen to be seen at the office of the board of public works; said stone shall be of uniform hardness and of the best quality of stone. All the stone to be set in a bed of sand and gravel sufficient in depth to measure thirteen (13) inches from top of stone when firmly pounded and set to top of excavation. No stone shall be received whose bed at full depth is less than seven-eighths ($\frac{7}{8}$) the area of top. The pavement must be laid in straight courses across the street, breaking joints with the blocks (except at the intersection of streets where it will be laid with cedar blocks), each stone breaking joints with the stone in adjoining courses at least two inches. All stone shall be set perpendicular.

Pounding.—The stone pavement when laid for the gutters shall be thoroughly rammed and pounded at least three times. The first parallel with the street, even with the surface, and twice
58 across the street, in a thorough manner, with a maul weighing from seventy-five to eighty-five pounds, and the unevenness of surface of the paving shall not be over one inch before it is pounded, and the whole surface of pavement, when finished, shall conform to the true grade and cross-section, as directed by the board, and in no case to be altered unless by the written consent of said board.

All sides of streets paved with stone shall not be covered with sand or gravel until the same is inpected by the board, and when inspected and accepted shall be covered with three-fourths ($\frac{3}{4}$) of an inch of sand and gravel.

Crosswalks.—There shall be crosswalks at all intersections of streets, walks to be made of the required width, and to be raised three (3) inches higher than the paving, of either cedar blocks or stone, as the board may direct.

Culverts.—The culverts shall be open, and of such width as the board may determine, to be formed of 3x14-inch timber, eight (8) feet long, with the end rounded off to conform to the grade of the pavement.

Connections with paved streets.—When the pavements connect with any other street paved with either wood or stone, a sufficient amount of the same shall be taken up and relaid to conform
59 to the crown of the streets, as established by the city engineer.

Connections with unpaved streets.—When the pavement intersects any unpaved street, there shall be laid across said unpaved street a piece of timber three (3) inches thick and fourteen (14) inches deep, set at the same grade, for the purpose of holding the cedar blocks in place.

Stone Paving.—Where required to be taken up and relaid, must conform with the crown of the cedar blocks, and laid in accordance with the specifications for stone paving.

Lumber and other material.—The lumber used shall be sound, and the mode and manner of the performance of the work shall be subject to the examination and approval of the board or such person or persons as the board may appoint.

Condition of side and cross walks.—All side and cross walks to be left in as good condition as at the commencement of the work, and the contractor is to supply all deficiencies of material that may be necessary.

60 (178.)—Board of Public Works, City of Detroit.

Paving Contract.

1. This agreement, made and concluded this sixteenth day of August, one thousand eight hundred and seventy-seven, by and between the city of Detroit, by the board of public works, in that behalf duly authorized by the common council of said city, party of the first part, and Thomas Ledbeter and Andrew and John A. Stewart, known and doing business under the firm name of Ledbeter and Stewart, of the city of Detroit, contractors, parties of the second part:

2. Witnesseth, That the said parties of the second part have agreed, and by these presents do agree, with the said party of the first part: for the consideration hereinafter mentioned and contained, and under the penalty of a bond bearing even date with these presents, and hereunto annexed, to furnish, at their own proper cost and expense, all the labor and materials, and regrade, repave, &c., &c., Jefferson avenue from the east line of Cass avenue to the west curb line of Second street, 80 feet wide, with irregular shape cedar blocks pavement, in conformity to the specifications and estimates hereto attached and made part of this contract and the grades and
61 cross-sections of said work now on file in the board of public works' office and to the acceptance of the said party of the first part.

3. And the parties of the second part hereby agree to clean up and carry off from said street all the stone, earth or other rubbish, or material which may have accumulated during the construction of said work.

4. All side and cross walks to be left in as good condition as at the commencement of the work, and the contractor is to supply all deficiencies of material that may be necessary, and at the intersection and crossing of streets where the same join said pavement the roadway should be left in good condition for public use.

5. The contractors shall erect and maintain a good and sufficient fence, railing or barrier around any and all excavations necessary for said work, in such a manner as to prevent accidents, and shall place upon such railing, fence or barrier, at twilight on each day, suitable and sufficient colored lights, and keep them burning during the night; and further, pay to, indemnify, and save the city harmless against all loss and damage which may be occasioned or arise by

reason of any negligence or carelessness of the party of the second part in doing such work.

6. To do all work in a thorough and workmanlike manner, and conform in every particular to the plans, specifications and di-
62 rections of the board of public works in a manner to interrupt as little as practicable the free use of the street by the public.

7. That they will claim no extra allowance for any contingencies in doing the foregoing work in a good and work*likeman* manner, whether specially set forth herein or not; and the party of the second part shall not claim nor be entitled to pay for any materials, work or labor not completed and fully accepted as completed.

8. That they will commence the work on or before the first day of September, 1877, and prosecute it so as to complete the same on or before the twenty-ninth day of September, 1877.

9. That they will carry on the work at such points as the board of public works shall from to time to time direct.

10. That the said board of public works shall have power to diminish the quantity of the work during its progress at a street crossing without vitiating this contract, but that no part of the work shall be altered by the contractors from that prescribed in the specifications without the express sanction of the board of public works in writing.

11. That they will when it becomes necessary to disturb the gas pipes, lamp posts, service pipes or other gas fixtures, or the water pipes or fixtures or street railroad track, notify the gas com-
62 pany or superintendent of the water works or street railroads respectively of said necessity, and that he will cause, permit or suffer any hindrance or interference with the agents of said companies or superintendents in the protection or relaying of said pipes or fixtures or street railroad tracks.

12. That on the party of the second part being notified by the board of public works in writing that the work herein provided for is in their opinion unnecessarily delayed and will not be finished in the prescribed time, the said board by and with the consent of the common council may declare this contract forfeited on the part of the party of the second part, and the party of the first part shall not be liable for any unfinished work or material furnished therefor.

13. The contractor, his foreman or clerk, shall upon or within six hours after receiving written notice from the board of public works, at any time and at all times, remove from the ground or works, whether worked or otherwise, all materials which may be unsound, improper and not corresponding with the specifications or drawings and not approved by them, and substitute and bring back good and proper materials in lieu thereof, and in case of default therein the board of public works shall be at liberty so to do at the
64 cost and charge of the contractor.

14. And the said contractor further agree that they will not employ unfaithful or incompetent workmen or overseers or disorderly persons, and that they will immediately discharge any person

in their employ who is declared to be so, and whenever directed by said board.

15. And the said contractor further agree that they will personally perform the several stipulations of this contract or by workmen under their immediate superintendence, and not by a sub contractor; and also that they will give their own undivided attention to the work, and will not assign or transfer their interest to any person or persons without the concurrence of said board in writing.

16. And the said party of the first part, in consideration of the faithful and entire performance of the foregoing stipulations, specifications and estimates hereto attached, hereby covenants and agrees to pay to the said party of the second part in the manner hereinafter provided the sum of thirty-three $\frac{5555}{9999}$ cents for each and every square yard contained in the above work for the entire thereof and all work and materials necessary to complete the same: *Provided*, The whole shall be completed and accepted as such by the common council.

17. It is further mutually agreed that the common council will cause a special assessment to be levied upon all lands or lots
65 fronting or abutting upon said Jefferson avenue street, lying between Cass street and Second street, in consideration of the materials to be furnished and the labor to be performed by said party of the second part; and it is further agreed by said party of the first part that the party of the first part will pay over to said party of the second part the avails of all special assessments levied and collected on lands liable by law, which shall be paid into the treasury of said city for or on account of such special assessments: *Provided*, That the party of the first part shall have the option to pay to said party of the second part any portion not to exceed three-quarters of the contract price of said work and materials, in street-paving bonds, in accordance with the charter and ordinances, in lieu of such assessments or moneys to be collected therefrom. But the said city of Detroit, party of the first part, shall not be liable for any part or portions of said special assessments until the same shall have been actually paid into the treasury of the said city. And it is expressly agreed by and between the parties hereto that the said city of Detroit, party of the first part, shall in no event be liable to the party of the second part for any part or portion of the cost of the materials and labor in front of any lands lying between the intersection of any streets, and that the said parties of the second part shall never ask for or receive from the city any part or portion thereof, but shall depend entirely upon such special assessments or the bonds aforesaid in lieu thereof for their compensation.

18. And it is further agreed between said parties that the
66 party of the first part shall by warrants drawn on the city treasurer by the controller upon estimates furnished by the board of public works from time to time on the completion of any or all intersections of cross streets, alleys, or interior spaces or other public property, pay to said party of the second part said war-

rants for and in full of all work fully performed and all materials furnished therefor by said party of the second part, as herein specified, at the intersection of any streets, alleys, or public property.

19. And it is further mutually agreed by the parties hereto that all measurement and determination of quantities shall be made by the city engineer, and that his measurement shall be final and conclusive between the parties, and that nothing in this agreement contained shall be so construed as to deprive the said city of any remedy or defense it may have under the same violation of any of the terms or conditions of this agreement; and the board of public works shall have the right to require the part of the second part to suspend or discontinue the work, or any part thereof, when, in the opinion of said common council, or the said board, the part of the second part is not doing the work in accordance with the stipulations of this contract; and for such work and materials as shall not comply with the specifications the party of the second part shall forfeit and have no claim whatever therefor.

67 20. And the parties hereto mutually agree that in case the laying of said pavement, or any of the work shall be enjoined or delayed by reason or claim that the same is in violation of, or an infringement of, any patent, the same shall not operate to or have the effect to constitute a breach of this contract or claim for damages by either party, and such work may be completed after such injunction or cause of delay shall be removed. The party of the first part shall defend any and all suits brought to restrain or enjoin such work and bring such suit to a final determination without unnecessary delay, and save the party of the second part harmless from damage and costs.

In witness whereof, the party of the first part has caused its seal to be affixed hereto, and the signature of the members of the board of public works in its behalf to be hereunto subscribed; and the parties of the second part have hereto set their hands and seals the day and year first above written.

(S'g'd) THOMAS LEDBETER. [SEAL.]
" ANDREW STEWART. [SEAL.]
" JOHN A. STEWART. [SEAL.]

THE CITY OF DETROIT,
(S'g'd) By NICOLL MITCHELL,
[SEAL.] " WM. PURCELL,
" ALEX. CHAPOTON,
Board of Public Works.

Attest: (S'g'd) CHARLES H. BERGMAN,
City Clerk.

68 DETROIT, *Sept.* 29, 1877.

We hereby acknowledge due service upon us of a copy of the within motion, notice of motion, affidavit of Jesse H. Farwell,

and copy of contract between the city of Detroit & Ledbeter & Stewart.

D. C. HOLBROOK,
Counselor's Solicitor for the city of Detroit.
NICOL MITCHELL.
WM. PURCELL.
ALEX. CHAPOTON.

(Endorsed:) Filed September 19, 1877, at 2 p. m. Jno. Graves, dep'y cl'k.

[Copy.]

69 *Injunction and Return.*—Filed 28th September, 1877.

United States of America. In the Circuit Court of the United States for the eastern district of Michigan, in chancery.

The President of the United States of America to the City of Detroit, and to its counsellors, attorneys, solicitors, servants and agents, greeting:

Whereas Robert C. Phillips, Jesse H. Farwell, and Eugene Robinson have lately exhibited to us in our said Circuit Court for the eastern district of Michigan, in chancery, their bill of complaint against you, said City of Detroit, praying to be relieved touching the matters therein complained of, and stating, among other things, that your acts and doings in respect thereof are contrary to equity and good conscience:

We therefore, in consideration thereof, and of the particular matters set forth in the said bill of complaint, do strictly enjoin and command you, the said City of Detroit, and you its counsellors, attorneys, solicitors, servants and agents, and each and every of you, under the penalty of ten thousand dollars, to be levied upon your lands, goods, and chattels to our use, and in the further penalty of being adjudged in contempt, that you do, until our said court shall have made further order thereupon, absolutely desist and refrain from, directly or indirectly, making, constructing, using, vending,
70 delivering, working, or putting in practice, operation or use, or in any way counterfeiting or imitating the invention of said Robert C. Phillips for wooden pavements secured to him by letters patent of the United States dated the fifth day of December, A. D. 1871, No. 121544, until the further order of this court.

But this injunction does not extend to streets when the contract for paving has already been executed, except Michigan avenue west of the west line of the Forsyth farm.

Witness the Honorable Morrison R. Waite, Chief Justice of the Supreme Court of the United States of America, this third day of

July, in the year one thousand eight hundred and seventy-seven, and of the independence of the United States the one hundred and first.

(S'gd) ADDISON MANDELL, *Clerk.*
GEO. H. LOTHROP,
STALLO & KITTREDGE,
Sol's for Compl'ts.

EASTERN DISTRICT OF MICHIGAN, } *ss.*
County of Wayne, }

Geo. H. Lothrop, being duly sworn, deposes and says that on the third day of July, A. D. 1877, he served the within writ of injunction upon the within named City of Detroit, defendant, in per-
71 son, within the said district, by delivering to Alexander Lewis, the mayor of said city of Detroit, a copy of the said writ, subscribed by the complainants' solicitor, and inscribed "copy," and showing the original, under the seal of the court at the time of such delivery to the said mayor.

That deponent intended to file said original writ, with proof of the service thereof, and supposed it had been filed, but finds that it has not; that he has made search among the papers in his office for such original and is unable as yet to find it, and fears that it has been lost or in some way destroyed.

GEO. H. LOTHROP.

Sworn to and subscribed to before me this 27th day of September, A. D. 1877.

D. BETHUNE DUFFIELD,
Notary Public, Wayne co., Mich.

(Endorsed:) Returned and filed this twenty-eighth day of September, A. D. 1877; A. Mandell, cl'k.

72 *Argument of Mo. for Contempt.*

At a session of the Circuit Court of the United States for the eastern district of Michigan, continued and held pursuant to adjournment at the district court room in the city of Detroit, on Monday, the eighth day of October, in the year one thousand eight hundred and eighty.

Present—Honorable Henry B. Brown, district judge.

Robert C. Phillips, Eugene Robinson and Jesse H. Farwell, compl'ts, *vs.* The City of Detroit, def't. } In equity. 2039.

The motion of complainants filed in this cause for commitment for contempt of the board of public works of the city of Detroit, coming on to be heard, is argued by Geo. H. Lothrop, esq., in support of said motion and by Mr. Holbrook in opposition thereto, and submitted.

73 *Notice and Affidavit of Cook, Hilsendegen, Smith & Stewart.*
Filed Oct. 12th, 1877.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell & Eugene Robinson } In equity.
vs.
The City of Detroit.

Please take notice that the affidavits of Calvin A. Cook, Valentine Hilsendegen, Hubbard Smith & John A. Stewart, copies of which are herewith served on you, will be read on the hearing of the motion in the cause that the board of public works of the city of Detroit stand committed for contempt.

Yours, GEO. H. LOTHROP,
Sol'r for Compl'ts.

Oct. 12, 1877.

To D. C. HOLBROOK, esq.,
Sol'r for Def't & Bd. of Pub. Works.

DETROIT, Oct. 12, 1877.

I hereby acknowledge service upon me of the above notice and copies of the affidavits therein mentioned.

D. C. HOLBROOK,
Sol'r for Def't & for Board of Public Works.

74 In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell & Eugene Robinson } In equity.
vs.
The City of Detroit.

EASTERN DISTRICT OF MICHIGAN, WAYNE COUNTY.

Hubbard Smith, of Detroit, being duly sworn, deposes and says that for twenty years he has been a practical paver and contractor in Detroit and all the principal cities in the state of Michigan.

That he is familiar with and has examined letters patent of the United States, No. 121544, granted to Robert C. Phillips, Dec. 5th, 1871.

That he has examined wooden pavements laid in the city of Detroit during the months of August and September, A. D. 1877, in which cedar blocks were laid on a sand or granite foundation and the spaces between them filled with sand and gravel, and the whole compacted by ramming or rolling. That said cedar blocks were placed with their fibers vertical without the bark and were in the natural form, except that a thin piece was split off from one side of the blocks. Deponent further says that in his opinion as a practical and expert

paver there is no practical difference between such pavements and the pavement described and claimed in said patent, and that
75 such pavements so laid in said city are substantially the same thing as the pavement described and claimed in said patent.

HUBBARD SMITH.

Sworn to and subscribed before me this eleventh day of October, A. D. 1877.

WILLIAM J. NESBITT,
Notary Public, Wayne county, Michigan.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell, & Eugene Robinson
vs.
The City of Detroit. } In equity.

EASTERN DISTRICT OF MICHIGAN, *Wayne county,* } *ss.*

C. A. Cook, of Detroit, being duly sworn, deposes and says that for twelve years he has been a practical paver and contractor in Detroit.

That he is familiar with and has examined letters patent of the United States No. 121,544, granted to Robert C. Phillips Dec. 5th, 1871.

That has examined wooden pavements laid in the city of Detroit during the months of August and September, A. D. 1877, in which cedar blocks were laid on a sand or gravel foundation, and the
76 spaces between them filled with sand and gravel, and the whole compacted by ramming or rolling; that said cedar blocks were placed with their fibers vertical, without the bark, and were in their natural form, except that a thin piece was split off from one side of the blocks. Deponent further says that in his opinion as a practical and expert paver there is no practical difference between such pavements and the pavement described and claimed in said patent, and that such pavements so laid in said city are substantially the same thing as the pavement described and claimed in said patent.

C. A. COOK.

Sworn to and subscribed before me this eleventh day of October, A. D. 1877.

WILLIAM J. NESBITT,
Notary Public, Wayne county, Michigan.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell, Eugene Robinson
vs.
The City of Detroit.
} In equity.

EASTERN DISTRICT OF MICHIGAN, *Wayne county,* } *ss.*

77 Valentine Hilsendegen, of Detroit, being duly sworn, deposes and says that for years he has been a practical paver and contractor in Detroit.

That he is familiar with and has examined letters patent of the United States No. 121,544, granted to Robert C. Phillips Dec. 5th, 1871.

That he has examined wooden pavements laid in the city of Detroit during the months of August and September, A. D. 1877, in which cedar blocks were laid on a sand or gravel foundation, and the spaces between them filled with sand and gravel, and the whole compacted by ramming or rolling.

That said cedar blocks were placed with their fibers vertical, without the bark, and were in their natural form, except that a thin piece was split off from one side of the blocks.

Deponent further says that in his opinion as a practical and expert paver there is no practical difference between such pavements and the pavement described and claimed in said patent, and that such pavements so laid in said city are substantially the same thing as the pavement described and claimed in said patent.

VALENTINE HILSENDEGEN.

Sworn to and subscribed before me this 11th day of October, A. D. 1877.

WILLIAM J. NESBITT,
Notary Public, Wayne county, Michigan.

78 In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell, & Eugene Robinson
vs.
The City of Detroit.
} In equity.

EASTERN DISTRICT OF MICHIGAN, *Wayne county,* } *ss.*

John A. Stewart, of Detroit, being duly sworn, deposes and says that for three years he has been a practical paver and contractor in Detroit.

That he is familiar with and has examined letters patent of the

United States No. 121,544, granted to Robert C. Phillips Dec. 5th, 1877.

That he has examined wooden pavements laid in the city of Detroit during the months of August and September, A. D. 1877, in which cedar blocks were laid on a sand or gravel foundation, and the spaces between them filled with sand and gravel, and the whole compacted by ramming or rolling.

That said cedar blocks were placed with their fibres vertical, without the bark, and were in their natural form, except that a thin strip was split off from one side of the blocks.

Deponent further says that in his opinion as a practical and expert paver there is no practical difference between such pavements
79 and the pavement described and claimed in said patent, and such pavements so laid in said city are substantially the same thing as the pavement described and claimed in said patent.

JOHN A. STEWART.

Sworn to and subscribed before me this eleventh day of October, A. D. 1877.

WILLIAM J. NESBITT,
Notary Public, Wayne county, Michigan.

(Endorsed:) Filed Oct. 12, 1877; A. Mandell, cl'k.

80 *Affidavit of D. Farrand Henry.*—Filed Oct. 13th, 1877.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell, Eugene Robinson
vs.
The City of Detroit.
} In equity.

EASTERN DISTRICT OF MICHIGAN, } ss.
County of Wayne.

D. Farrand Henry, of Detroit, being duly sworn, deposes and says that for twenty years he has been a practical engineer in Detroit.

That he is familiar with and has examined letters patent of the United States No. 121,544, granted to Robert C. Phillips Dec. 5th, 1871.

That he has examined wooden pavement laid in the city of Detroit during the months of August and September, A. D. 1877, in which cedar blocks were laid on a sand or gravel foundation and the spaces between them filled with sand and gravel, and the whole compacted by ramming or rolling.

That said cedar blocks were placed with their fibres vertical, without the bark, and were in their natural form, except that a thin piece was split off from one side of the blocks.

81 Deponent further says that in his opinion as a practical and expert engineer there is no practical difference between such

pavements and the pavement described and claimed in said patent, and that such pavements so laid in said city are substantially the same thing as the pavements described and claimed in said patent.

D. FARRAND HENRY.

Sworn to and subscribed before me this 13th day of October, A. D. 1877.

WILLIAM J. NESBITT,
Notary Public, Wayne county, Michigan.

(Endorsed:) Filed Oct. 13, '77. A. Mandell, cl'k.

82 *Note of issue.*—Filed October 16th, 1877.

State of Michigan. In the U. S. Circuit Court for the eastern dist. of Michigan.

Robert C. Phillips, Eugene Robinson, & Jesse H. Farwell *vs.* The City of Detroit. } In chancery. Oct. 15th, 1877.

The above-entitled cause will be brought on for hearing at the next term of this court, notice having been served on the part of the defendant on George H. Lothrop, esq., sol'r for the compl't, according to the statute and rules of this court.

You will please place said on the issue docket of this court for said term.

D. C. HOLBROOK,
Sol'r for the city of Detroit.

(Endorsed:) Filed Oct. 16, 1877. A. Mandell, cl'k.

83 *Affidavit of Robinson, Walton & Lacey.*—Filed Oct. 11th, 1877.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell, & Eugene Robinson *vs.* The City of Detroit. } In equity.

Please take notice that the affidavits of Eugene Robinson, Joseph B. Walton and Heman A. Lacey, copies of which are herewith served on you, will be read at the hearing of the motion in this cause that the board of public works of the city of Detroit stand committed for contempt in violating the injunction heretofore issued in this cause.

Detroit, October 10, 1877.

GEO. H. LOTHROP,
Sol'r for Compl'ts

To D. C. HOLBROOK, esq.,
Sol'r for Def't & Bd. of Pub. Works.

I hereby acknowledge service upon me of the above notice & of copies of the affidavits mentioned therein.

October 10th, 1877.

D. C. HOLBROOK,
Sol'r for Def't and for Board of Public Works.

84 In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell, & Eugene Robinson } In
vs. } equity.
The City of Detroit. }

EASTERN DISTRICT OF MICHIGAN, } *ss.*
Wayne county, }

Heman A. Lacey, of Detroit, being duly sworn, deposes and says that for several years last past he has been a practical paver and contractor in Detroit. That he has examined letters patent of the United States No. 121544, granted to Robert C. Phillips December 5, 1871, and is familiar with the contents thereof. That he has examined pavements laid in the city of Detroit during the months of August and September, A. D. 1877, on Bates street and Monroe avenue; that such pavements are composed of cedar blocks in their natural form, the bark being stripped off, except that a thin piece is split from one side of the blocks; that the blocks are laid in exact accordance with the specification and claim of said letters patent, and that in deponent's opinion said pavements are substantially the same thing as the pavement described in said patent.

HEMAN LACEY.

Sworn to & subscribed before me this 10th day of Oct., A. D. 1877.

GEO. B. REMICK,
Notary Public, Wayne county, Mich.

85 In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell, & Eugene Robinson } In
vs. } equity.
The City of Detroit. }

EASTERN DISTRICT OF MICHIGAN, } *ss.*
Wayne county, }

Joseph B. Walton, of Detroit, being duly sworn, deposes and says that for several years last past he has been a practical paver and contractor in Detroit; that he is familiar with letters patent of the United States No. 121544, granted to Robert C. Phillips, and has examined the same. That he has examined the pavement laid on

Monroe avenue and the Campus Martius, in the city of Detroit, under a contract from the city of Detroit to James McGonegal. That the only difference between that pavement and the pavement described in said patent is that a thin shaving ½ inch to 1½ inches in thickness is split off from one side of the block, and that in deponent's opinion such pavement is substantially the same as that described in said patent.

JOSEPH B. WALTON.

Sworn to and subscribed before me this 10th day of October, A. D. 1877.

GEO. B. REMICK,
Notary Public, Wayne co., Mich.

86 In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell, & Eugene Robinson } In
vs. } equity.
The City of Detroit. }

EASTERN DISTRICT OF MICHIGAN, } *ss.*
County of Wayne, }

Eugene Robinson, of Detroit, being duly sworn, deposes and says that he is a practical engineer and surveyor, and has been actively engaged as an engineer and surveyor until within a few years last past; that he is one of the complainants in this cause; that for several years last past he has been, and still is, actively engaged in the business of paving in the city of Detroit, and is a practical and expert paver.

That deponent and Jesse H. Farwell are the sole and exclusive licensees for the state of Michigan of the invention covered by the patent of Robert C. Phillips, upon which this suit is brought, and that deponent and said Farwell have at large expense provided themselves with all the necessary appliances and materials for laying the pavement covered by said patent, and at all times since the commencement of this suit have been, and are now, ready & willing to lay said pavement in the city of Detroit.

That on the third day of July, A. D. 1877, a writ of injunction was issued in this cause restraining said defendant, its servants,
87 agents, &c., from laying or counterfeiting or imitating the invention of said Robert C. Phillips; that said writ was on said day served on the mayor of the city of Detroit, and that the members of the board of public works had knowledge and notice on said day of the issuing and service of said writ of injunction.

That on the 16th day of August, A. D. 1877, the defendant, by said board of public works, contracted with the firm of Ledbeter & Stewart to pave Jefferson avenue, in said city, from the east line of

Cass street to the west line of Second street; that said contract has been completed, and amounted to about 4,601 square yards.

That on the 17th day of August, A. D. 1877, the defendant, by said board of public works, contracted with James McGonegal to pave Monroe avenue, in said city, from Woodward avenue to Randolph street; that said contract has been completed, and amounted to about 7,283 square yards.

That on the 17th day of August, A. D. 1877, the defendant, by said board of public works, contracted with James McGonegal to pave Bates street, in said city, from Jefferson avenue to Atwater street; that said contract has been completed, and amounted to about 1,531 square yards.

That on the 20th day of August, A. D. 1877, the defendant,
88 by said board of public works, contracted with the firm of Ledbeter & Stewart to pave Congress street, in said city, from Woodward avenue to Randolph street; that said contract has been completed, and amounted to about 1,573 square yards.

That on the third day of September, A. D. 1877, the defendant, by said board of public works, contracted with the firm of Ledbeter & Stewart to pave Congress street, in said city, from Woodward avenue, in said city, from the south curb of Williams & Park streets to the north line of Adams avenue; that said contract has been completed, and amounted to about 2,560 square yards.

That on the 14th day of September, A. D. 1877, the defendant, by said board of public works, contracted with James McGonegal to pave the Campus Martius, in said city, in front of lots 43, 44, 45, & 46, in section 7, of the Governor & Judges' plan of said city, from the west line of Monroe avenue, 40 feet wide; that said contract has been completed, and amounted to about 781 square yards.

That in addition to the contracts above set forth, said defendant, by said board of public works, has contracted with various parties subsequent to the 16th day of August, A. D. 1877, for the paving of the following streets in the city of Detroit, to wit: Second avenue, from Bagg street to Alexandrine avenue, 9,456 square yards; Seventh street, from Fort to Lafayette streets, 786 square yards; Ran-
89 dolph street, from Jefferson avenue to Fort street, 4,939 square yards; that work has been commenced on said contracts, and is now being prosecuted, but that said contracts are not yet completed.

That the specifications and conditions of all the contracts herein set forth are exactly similar to those of Exhibit X, attached to the affidavit of Jesse H. Farwell, on file in this cause.

That under and by the terms of all of said contracts all work done thereunder is subject to the control of the board of public works, and no material can be used, or work done, except such as meets their approval.

That the pavement laid and now being laid under said contracts is composed of a foundation of sand or gravel, on which are laid cedar blocks in their natural state, except that the bark is stripped

off, and except that from a portion of said blocks a piece from ½ inch to 1½ inches in width is split off from one side, with the fibres set vertical, and the spaces between said blocks are filled with sand and gravel, and the whole is then compacted by rolling or ramming.

That in the opinion of deponent, as a practical and expert paver, such pavement is a mere colorable evasion and infringement of the patent of said Phillips.

That the average price of such pavement during the season has been the sum of sixty-seven cents per square yard, and that
90 during that time no other good wooden pavement could be laid for a less sum than one dollar and ten cents per square yard, and that said defendant has realized from said violation of said injunction a profit of about forty-three cents per square yard on all such pavement so laid by it.

That deponent and said Farwell, in conjunction with said Phillips, have fixed and established a royalty or license fee for the use of said invention of sixteen cents per square yard, which has been recognized and acted upon by defendant prior to the commencement of this suit.

That by the aforesaid violation of said injunction, the complainants in this cause have suffered an actual damage of sixteen cents per square yard on all its pavement hereinbefore set forth.

EUGENE ROBINSON.

Sworn to & subscribed before me this 10th day of October, A. D. 1877.

WILLIAM J. NESBITT,
Notary Public, Wayne co., Mich.

(Endorsed:) Filed Oct. 11, 1877; A. Mandell, cl'k.

91 *Argument of mo. for attachments postponed.*

At a session of the Circuit Court of the United States for the eastern district of Michigan, continued and held pursuant to adjournment, at the district court room, in the city of Detroit, on Saturday, the fifteenth day of October, in the year one thousand eight hundred and seventy-seven.

Present—Hon. Henry B. Brown, district judge.

Robert C. Phillips, Eugene Robinson, and Jesse H. Farwell, compl'ts,
vs.
The City of Detroit, deft. } In equity, 2039.

On motion of D. C. Holbrook, esq., of counsel for defendant, it is ordered that the hearing of the motion for attachment for contempt in this cause be and the same is hereby postponed for two weeks from this day.

92 *Application to file amendment 3d to answer.*—Filed Oct. 30, 1877.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Eugene Robinson, Jesse H. Farwell } In equity.
vs.
The City of Detroit.

Amendment number three to the answer of the defendant in this cause, to wit:

Insert in paragraph numbered sixteen the following further subdivision thereof, to wit:

16. In the city of London, province of Ontario, dominion of Canada, in the years 1861 and 1862, and known by David Wilkie of the city of Detroit, Michigan, and other persons whose names are now unknown, residing in said city of London and elsewhere.

THE CITY OF DETROIT,
By D. C. HOLBROOK,
Its Solicitor.

93 In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Eugene Robinson, & Jesse H. Farwell } In equity.
vs.
The City of Detroit.

STATE OF MICHIGAN, COUNTY OF WAYNE.

DeWitt C. Holbrook, of said county and state, being duly sworn, doth depose and say that he is the solicitor of the complainant, and that within the last two weeks he has been informed that the said pavement and improvement set forth in the bill in this cause was laid, known, and used in the city of London, Canada, in the years 1861 and 1862, by David Wilkie, of the city of Detroit, in said county of Wayne; that he believes such pavement and improvement was laid, and that in his opinion and belief it is important and necessary that the same should be set forth by an amendment to the answer in this cause.

D. C. HOLBROOK.

Sworn and subscribed before me this 30th October, 1877.

A. P. T. BENDEAU,
Notary Public, Wayne county, Mich.

94 In the Circuit Court of the United States for the eastern district of Michigan. In Equity.

Robert C. Phillips, Eugene Robinson, and Jesse H. Farwell
vs.
The City of Detroit.

To Messrs. STALLO & KITTREDGE, sol'rs for compl'ts.

Take notice, that on Monday next, the fifth day of November next, at the opening of the above court, or as soon thereafter as counsel can be heard, an application will be made for leave to file an amendment, a copy of which is herewith served, numbered three, to the answer of the defendant in this cause, and for such other further orders as to the court may seem proper, and which application will be based upon the bill and answer in this cause and the affidavit of D. C. Holbrook, a copy of which is also served herewith.

D. C. HOLBROOK,
Sol'r for def't.

Detroit, Oct. 30th, 1877.

(Endorsed:) Filed Oct. 30, 1877; A. Mandell, clerk.

95 *Affidavits of Members of the Board of Public Works.*—Filed Nov. 2d, 1877.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell, & Eugene Robinson
vs.
The City of Detroit.
In equity.

STATE OF MICHIGAN, COUNTY OF WAYNE.

Nicol Mitchell, Alexander Chapeton, and William Purcell, against whom a motion has been made that they stand committed for contempt of this honorable court, make this their answer to said motion, and each for himself shows as follows:

First. They admit they had notice of the preliminary injunction in this cause, and that upon receiving such notice they desisted from making contracts for the laying of the pavement described in the bill in this cause.

Second. That there were many streets in the city of Detroit that required to be paved and repaved, and the public necessity actually required they should be paved and repaved the present year, and as members of the board of public works it was their duty to cause such improvements to be made.

Third. That they had no intention to disobey or violate in any way the injunction of this honorable court, and that such
96 streets should be paved with cedar-block pavement, they caused to be drawn a specification therefor, a copy of which

these respondents believe to be annexed to the affidavit in this matter, marked Exhibit X, and which they were advised was a pavement different from that set forth in the bill in this cause, and were also advised by D. C. Holbrook, the city *conselor* of the city of Detroit and the legal adviser of these respondents, it was not and could not be construed to be any infringement on the patent of said Phillips, the complainant, as the only novelty in the invention of said Phillips, and upon which his patent was granted, was the use of blocks in their natural state, (except the taking the bark therefrom,) cut from the body and limbs of trees, and that as an instance of the only novelty claimed by said patent, these respondents call the attention of the honorable court to the use and construction for a quarter of a century to the common cobblestone pavement in the city of Detroit, the only difference in the construction between the pavement claimed by the complainant being in the use of wood instead of stone, the excavating, grading, and preparing the road-bed for the pavement being precisely the same as that described in the complainant's patents, and the only difference being in the use of blocks of wood as cut from the tree and limbs, with the bark removed, instead of stone.

97 That the contracts referred to in the affidavit annexed to the motion in this matter contain a specification of the manner the whole work mentioned therein should be performed and of the materials to be used; that under the head of blocks for said pavement they are required to be as follows:

"Blocks (stripped of the bark) of irregular or octagon shape, sawed from cedar timber; all blocks shall be cut from good sound live timber, free from loose or rotten knots or other defects, and shall not measure more than ten or less than four square inches on top and not less than seven inches in depth, and so placed as to make, as near as possible, the spaces of uniform size."

That the inspectors having charge of such paving having been particularly instructed that such blocks of wood must not be used nor laid in their natural form; that such blocks must be split and their form made irregular, and that no round blocks or in its natural form must be accepted, and that the patent of the complainant must not be infringed, nor his pavement, as patented, used.

That whenever any of these respondents have discovered blocks in their natural form being used, they have ordered them taken up and removed from said pavement; that their instructions have been that such blocks must be split, and not left their natural form.

98 That if any pavement has been laid in violation of said injunction, it has been without and contrary to the directions of these respondents.

These respondents further show that they are advised and believe pavements constructed in the same manner as that described in the bill in this case have been laid and used for at least twenty years before the date of the complainant's patent, and that such pavement

was described in various publications in the United States more than ten years ago; that pavements constructed in the same manner as that described in the bill in this cause, except the use of such blocks in their natural state, have been laid and used for more than ten years last past; that such pavements, instead of the natural block, were laid with blocks of wood of different forms, such as blocks six by six, six by eight, two and three by six and eight inches, and hexagonal block, and block split without any regularity of form.

These respondents admit that they have reported to the common council of the city of Detroit that contracts for paving, to be done according to the said specification, have been performed and the work accepted; that they have done so in the report of the inspectors having charge of the work; that the same was done according to the several contracts therefor; that if said contractors have laid the pavement in such a manner as to violate the injunction in this
99 cause, it has been so done without the knowledge and consent of these respondents; that the acceptance of such pavement, these respondents submit, was not and is not any violation on the part of these respondents of said injunction, when the same was not so laid with their knowledge and consent.

These respondents further show that they are advised by said city counselor and they believe that the said patent of said complainant is null and void for the want of novelty in the thing patented, and they submit to the court that the same is void and so appears on its face.

That the complainants, Farwell & Robinson, who have been and are contractors for paving, have since said injunction was issued and served, been interested in various ways, directly and indirectly, in contracts for paving according to the specification complained of as an evasion, and as follows, to wit:

That one John F. McMillan has allowed himself and his name to be used by and for said Farwell & Robinson and has taken a large number of contracts for said paving in his own name, but which in reality were for said Farwell and Robinson, and who assisted him in getting said contracts by individually, one or both, signing eight or ten of his said McMillan's bidding bonds; that said Robinson on the 27th of September, 1877, entered into a contract personally to repave Michigan avenue from Seventh to Thirteenth street; that on the 23rd October, 1877, he entered into a personal contract
100 for the repaving of part of Gratiot and Griswold streets; that since said injunction was issued said Farwell and Robinson have consented that said McMillan might with the consent of the board of public works in some cases lay such cedar blocks in their natural state without change in form, as the making of such blocks irregular in shape is attended with a useless expense.

That said Robinson and McMillan have entered into other contracts for repaving according to said specification, and there failed to perform the same, and as these deponents believe to prevent other contractors from laying such pavements, and said Farwell, Robinson and

McMillan have had and taken their chances to lay said pavement and taken contracts therefor the same as any other contractor in the city of Detroit, and through their instrumentality they have taken as many if not more of said contracts to lay said pavement than any other contractors, and now while they claim the undersigned may violate said injunction with impunity in letting to them contracts, they claim it cannot be so done as to contracts with others.

That all pavements laid as above have been under resolutions of the common council.

NICOL MITCHELL.
WM. PURCELL.
101 ALEX. CHAPETON.

Sworn and subscribed before me this 29th October, 1877.

JOHN CAMPBELL,
Notary Public, Wayne co., Mich.

(Endorsed:) Filed Nov. 2d, 1877; A. Mandell, clk.

102 *Affidavits of D. C. Holbrook & superintendent of paving on motion for contempt.*—Filed Nov. 2d, 1877.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell, & Eugene Robinson
vs.
The City of Detroit. } In Equity.

STATE OF MICHIGAN, COUNTY OF WAYNE.

DeWitt C. Holbrook, of the city of Detroit, in said county and state, being duly sworn, doth depose and say that he has been the city counselor of the city of Detroit aforesaid for over five years; that he has been familiar with and is acquainted with all the different kinds of wood pavement which have been laid within the city of Detroit during that time; that his attention has been called particularly to the pavement known as the Phillips pavement, and for which the complainant obtained a patent, as set forth in the bill in this cause; that the patent therefor was first shown to deponent some five years ago, and after such pavement had been partially adopted by the city of Detroit for paving streets; that deponent then gave it as his opinion that such patent could not be valid; that such pavement was not novel; that such patent covered an entire pavement,
of which there was nothing new, except the claim of blocks
103 of wood cut from trees, limbs, & saplings, and used in their natural state, except the taking off of the bark; that the complainant not only claimed in and by said patent that which was new, but also that which was old, nor did he claim it as a combination;

that the opinion of the deponent is still the same as above expressed.

This deponent further says that, upon the service of the injunction in this cause, he advised the board of public works, consisting of the Nicol Mitchell, Alexander Chapeton, and William Purcell, that no more pavement which they had been laying, known as the round cedar-block pavement, and called the Phillips pavement, could be laid while said injunction remained in force; that thereupon it was proposed to split and divide the round cedar blocks and make the blocks into irregular shapes and not use the block in its natural form; and this deponent did advise said board that such use of such blocks and pavements constructed therewith would not be an infringement of the complainant's patent, nor a violation of said injunction, and thereupon, on the advise of this deponent, such specification was changed to the irregular block pavement of which complaint is made; that this deponent supposed, and so did the board of public works, as deponent believes, that such blocks would be split and the form changed; and this deponent advised the said board to instruct the contractors and superintendents of
104 having to split such blocks and render them irregular in form, and it appears such advise was followed, and such contractors and superintendents so instructed.

D. C. HOLBROOK.

Sworn and subscribed before me this 29th October, 1877.

_____,
Notary Public, Wayne co., Mich.

105 In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell, & Eugene Robinson
vs.
The City of Detroit.
} In Equity.

STATE OF MICHIGAN, COUNTY OF WAYNE.

William Buchanan, of said county and state, being duly sworn, doth depose and say that he was appointed by the board of public works of the city of Detroit superintendent of the repaving of Bates street in said city, in the month of August, 1877; that deponent was instructed by said board to see that no block for paving was used in its natural state; that each block must be split and changed so as to make the same irregular in form; that accordingly the blocks in their natural form were thrown out, rejected.

W. BUCHANAN.

Sworn and subscribed before me this 26th October, 1877.

HENRY G. McINTIRE,
Notary Public, Wayne co., Mich.

106 In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell & Eugene Robinson
vs.
The City of Detroit. } In Equity.

STATE OF MICHIGAN, }
County of Wayne. }

Adam Schulte, of said county and state, being duly sworn, says that he was the superintendent of the repaving of Monroe avenue under the contract let to James McGonegal by the board of public works of the city of Detroit, the work being done in the months of September and October, 1877; that the specification for said work was what is known and called irregular block pavement; that this deponent was particularly instructed not to permit any round blocks and blocks in their natural state to be used; that no block was to be used unless a part of it was chipped or split off so as to make the form irregular and not round.

ADAM SCHULTE.

Sworn to and subscribed before me this 25th October, 1877.

HENRY G. McINTIRE,
Notary Public, Wayne co., Mich.

107 In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell & Eugene Robinson
vs.
The City of Detroit. } In Equity.

STATE OF MICHIGAN, }
County of Wayne. }

Ezra Hughes, of the city of Detroit, being duly sworn, says that he was the superintendant of the repaving of a part of Jefferson avenue between Cass and Second streets, and also on Woodward avenue between East and West Grand Circus Park, under contracts let by the board of public works to Messrs. Ledbeter & Stewart. The work was done in the months of September & October, 1877; that the specifications for said work was what is known and called the irregular block pavement. That this deponent was particularly instructed by the board of public works not to permit any round blocks in their natural state to be used, & that no block was to be used unless a part of it was chipped off or split so as to make the form thereof irregular and not left in its natural form; that deponent ordered removed all blocks that he saw laid in their natural shape.

EZRA HUGHES.

Sworn to & subscribed before me this 25th October, 1877.

HENRY G. McINTIRE,
Notary Public, Wayne co., Mich.

(Endorsed:) Filed Nov. 2, 1877. A. Mandell, clerk.

108 At a session of the Circuit Court of the United States for the eastern district of Michigan, continued and held pursuant to adjournment, at the district court room in the city of Detroit, on Friday, the second day of November, in the year one thousand eight hundred and seventy-seven—present: Honorable Henry B. Brown, district judge.

Robert C. Phillips et al., comp'ts,
vs.
The City of Detroit, def't. } In Equity, 2039.

Argument of Motion for Contempt.

The motion of complainants for attachment for contempt against the board of public works of Detroit for violation of injunction now coming on to be heard, is argued by counsel for the respective parties and submitted.

109 *Order on Allowance of 3d Amendment to Answer.*

At a session of the Circuit Court of the United States for the eastern district of Michigan, continued and held pursuant to adjournment, at the district court-room, in the city of Detroit, on Monday, the fifth day of November, in the year one thousand eight hundred and seventy-seven—

Present: Honorable Henry B. Brown, district judge.

Robert C. Phillips, Eugene Robinson, and Jesse H. Farwell, compl'ts,
vs.
The City of Detroit, def't. } 2039. In equity.

On application of defendant and with consent of complainants in open court, the defendant's third amendment to answer, filed the thirtieth day of October last, are allowed and permitted, and the replication to the original answer to stand as a replication to all amendments to said aid answer.

110 *Order Continuing Injunction.*

At a session of the Circuit Court of the United States for the eastern district of Michigan, continued and held pursuant to adjournment, at the district court-room, in the city of Detroit, on Tuesday, the sixth day of November, in the year one thousand eight hundred and seventy-seven—

Present: Honorable Henry B. Brown, district judge.

Robert C. Phillips, Jesse H. Farwell, and Eugene Robinson, complainants,
vs.
The City of Detroit, defendant.
} 2039. In equity.

On motion of George H. Lothrop, solicitor for complainants, it is ordered that the preliminary injunction heretofore granted in this cause be and the same is hereby continued in full force until the further order of this court.

111 *Modification of Injunction Allowing Acceptance of Work.*—Filed Dec. 7th, 1877.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips et al.
vs.
The City of Detroit.
} In equity.

The injunction in this case is so modified as to permit the acceptance of the work done under present contracts made prior to the decision against the board of public works.

Dec. 7th, 1877. HENRY B. BROWN,
Dist. Judge.

(Endorsed:) Entered and filed Dec. 7, 1877; A. Mandell, cl'k.

112 *Notice of examining of witnesses by def't.*—Filed Jan'y 19th, 1878.

In the Circuit Court of the United States for the eastern district of Michigan. In equity.

Robert C. Phillips, Jesse H. Farwell & Eugene Robinson
vs.
The City of Detroit.

To Messrs. STALLO & KITTREDGE,
Sol'rs for Compl't:

Take notice that on Thursday next, the 10th day of January inst., 1878, at 2 o'clock in the afternoon of that day, the defendant will examine the following named witnesses in this case, to wit: Alanson Sheeley, Jacob S. Farrand, Harvey King, John Owen, Alexander Chapeton, Ichabod Gooderich, John S. King and Davie Wilkie, all of the city of Detroit, state of Michigan, before Charles Flowers, esq., a commissioner and examiner of said court, at the office of D. C. Holbrook, Moffat building, Detroit, Michigan, at which time and place you may appear if you see fit.

Yours, D. C. HOLBRONK,
Sol'r for Def't.

Detroit, Jan'y 5, 1878.

(Endorsed:) Filed Jan'y 19, 1878. Jno. Graves, dep'y cl'k.

113 *Consent of substitution of sol'r for def't.*—Filed Jan'y 19th, 1878.

In the Circuit Court of the United States for the eastern district of Michigan. In equity.

Robert C. Phillips, Eugene Robinson & Jesse H. Farwell
vs.
The City of Detroit.

I hereby consent to the substitution of Fred A. Barker as the solicitor of defendant in this cause.

D. C. HOLBROOK.

Detroit, Jan'y 16, 1878.

(Endorsed:) Filed January 19, 1878. Jno. Graves, dep'y clerk.

114 *Precipe for entry of order of substitution.*

United States of America. In the Circuit Court of the United States for the eastern district of Michigan. In equity.

Robert C. Phillips, Eugene Robinson & Jesse H. Farwell
vs.
The City of Detroit.

On filing a stipulation in this cause and on motion of F. A. Barker, solicitor for the said defendant, it is ordered that the said F. A. Barker be and he is hereby substituted in place of D. C. Holbrook, esq., as the solicitor and counsel for the said defendant.

Detroit, Jan'y 19, 1878.

F. A. BARKER,
Sol'r for Def't.

To the Clerk: Please enter the above order.

F. A. BARKER,
Sol'r for Def't.

(Endorsed:) Filed January 19, 1878. (Sg'd) Jno. Graves, dep'y clerk.

115 *Stipulation.*—Filed M'ch 16th, 1878.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Eugene Robinson, & Jesse H. Farwell
vs.
The City of Detroit. } In equity.

It is hereby stipulated and agreed that an order may be entered in this cause extending the time for taking therein ninety days from this

date, and providing that said defendant shall close its proofs in said cause within thirty days from this date, and that the plaintiffs shall complete their rebutting testimony within the remaining sixty days of said ninety days.

Detroit, March 15, 1878.

GEO. H. LOTHROP,
Sol'r for Compl'ts.
D. C. HOLBROOK,
Sol'r for Compl'ts.

(Endorsed:) Filed March 16, 1878; Jno. Graves, dep'y cl'k.

116 *4th Amendment to Answer.*—Filed April 3d, 1878.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Eugene Robinson, & Jesse H. Farwell
vs.
The City of Detroit. } In equity.

Amendment number four to the answer of defendant in this cause, to wit:

Insert in paragraph numbered thirteen the following subdivisions thereof, to wit: 13th. The English patent to David Stead, of Great Winchester street, London, England, dated May 8th, 1838, number 7,645, for an improvement of making and paving streets, &c.

The letters patent of the United States issued March 22d, 1870, number 101,100, to D. C. Colby, of Washington, D. C., for an improved street pavement.

The letters patent of the United States issued April 5th, 1870, number 101,590, to Tallmadg E. Brown, of Memphis, Tennessee, for an improvement in wood pavements.

D. C. HOLBROOK,
Sol'r for Def't.

This amendment may be filed.
April 2, 1878.

GEO. H. LOTHROP,
Sol'r for Compl'ts.

(Endorsed:) Filed April 3d, 1878; A. Mandell, cl'k.

117 *Consent to place case on docket.*—Filed May 29th, 1878.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Eugene Robinson, & Jesse H. Farwell
vs.
The City of Detroit.
} In equity.

To the Clerk of said court:

Please place this cause upon the docket of said court for the June term, for hearing upon pleadings & proofs.

Yours,

GEO. H. LOTHROP,
Sol'r for Compl'ts.

D. C. HOLBROOK,
Sol'r for Def't.

(Endorsed:) Filed May 29, 1878. A. Mandell, cl'k.

118 *Stipulation entering time to make proofs.*—Filed May 29th, 1878.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Eugene Robinson, & Jesse H. Farwell
vs.
The City of Detroit.
} In equity.

The time for defendant to take proofs is entered for twenty days from this date, and the complainant may have ninety days thereafter to take these proofs, and the case may be put on the docket for the June term for final heard by Judge Brown.

GEO. H. LOTHROP,
Sol'r for Compl'ts.

D. C. HOLBROOK,
For Def't.

May 29, 1878.

(Endorsed:) Filed May 29, 1878. A. Mandell, cl'k.

119 The President of the United States to Hubbard Smith:

You are hereby commanded that, laying aside all and singular your business and excuses, you be and appear before Charles Flowers, a commissioner of the Circuit Court of the United States for the eastern district of Michigan, at the office of D. C. Holbrook, in the city of Detroit, in said district, on Wednesday, the 19 day of June instant, A. D. 1878, at 3 o'clock p. m. of said day, then and there to testify and give evidence in a case to be tried, wherein Robert C. Phillips & others, complainants, and the city of Detroit is defendant, on behalf of said defendant.

Hereof fail not, under the penalty what may befall you thereon.

Witness the Hon. Morrison R. Waite, Chief Justice of the Supreme Court of the United States, this 18 day of June, in the year of our Lord one thousand eight hundred and seventy-eight.

[L. S.] ADDISON MANDELL, *Clerk.*

120 (Endorsed:) 2029. Circuit Court of U. S., eastern dist. of Michigan. Robert C. Phillips et al. *vs.* The City of Detroit. Subpœna. Hubbard Smith. Returned & filed June 28, 1878. A. Mandell, clerk; F. A. Baker, sol'r for def't.

EASTERN DISTRICT OF MICHIGAN, *ss:*

I hereby certify & return that the within-named witness was absent from the city and could not be reached in time for attendance, as within commanded.

S. S. HATLEEN,
June 19, '78. *U. S. Marshal.*

121 *Depositions.*—Filed Feb'y 27th, 1878.

Depositions of Henry J. Williams, Chas. D. Wheat, Robert P. Kelly, William Reed and William Henry, witnesses produced, sworn and examined at my office, No. 232½ Montgomery street, in the city and county of San Francisco, state of California, under and by virtue of the annexed commission issued out of the Circuit Court of the United States for the eastern district of Michigan, in a certain cause therein pending and at issue between Robert C. Phillips, Eugene Robinson and Jesse H. Farwell, as plaintiffs, and the city of Detroit as defendant, and under and by virtue of the annexed stipulation heretofore, to wit, on October 18th, 1877, made in said cause.

E. H. THARP,
Notary Public and Commissioner.

Deposition of Henry F. Williams and others.

CHARLES D. WHEAT, being first duly sworn to speak the truth, the whole truth and nothing but the truth, deposes and says as follows:

To the first interrogatory he saith: I am 34 years of age; I reside in San Francisco; my occupation is that of real estate
122 agent.

To the second interrogatory he saith: I know of such a pavement having been laid on the Mission Ridge toll bridge.

To the third interrogatory he saith: I don't know who laid it; I don't remember the exact date when it was laid; it was composed of cord-wood sawed into lengths of about four inches and placed upon the board flooring of the bridge between the railroad tracks, with the grain of the wood in a vertical position; after that the spaces between the blocks were filled with gravel and asphaltum,

and then the entire surface of the pavement was covered with a coating of asphaltum, sand and gravel.

To the fourth interrogatory he saith: I have already answered that fully in the third interrogatory.

To the fifth interrogatory he saith: I don't know anything more about it.

C. D. WHEAT.

Subscribed and sworn to before me this 3d day of January, A. D. 1878.

E. H. THARP,
Notary Public and Commissioner.

123 ROBERT P. KELLY, being first duly sworn to speak the truth, the whole truth and nothing but the truth, deposes and says as follows:

To the first interrogatory he saith: I am 40 years of age; I reside in San Francisco; my occupation is that of contractor.

To the second interrogatory he saith: I do know of such a pavement being laid.

To the third interrogatory he saith: It was laid by Henry F. Williams; I think it was in 1868; there was no grading done; it was laid on the planking of the bridge; the pavement was composed of redwood cordwood cut into blocks of three or four inches; the openings were then filled in with tar and asphaltum, prepared by heating, and the surface of the pavement was then covered with a coating of five gravel; the same kind of pavement was laid on Berry street between Third and Fourth streets in this city; the street being a planked street the pavement was laid on the planks as described above.

To the fourth interrogatory he saith: I have answered this interrogatory in my answer to the third interrogatory.

To the fifth interrogatory he saith: The pavement on the
124 bridge was in use for two years, in a fair condition, and was only taken up when it became necessary to renew the planking of the bridge.

E. P. KELLY.

Subscribed and sworn to before me this 11th day of January, A. D. 1878.

E. H. THARP,
Notary Public and Commissioner.

WILLIAM HENRY, being first duly sworn to speak the truth, the whole truth, and nothing but the truth, deposes and says as follows:

To the first interrogatory he saith: I am 46 years of age; I reside in San Francisco; my occupation is that of toll collector at Mission Bay bridge.

To the second interrogatory he saith: I know of such a pavement being laid about the year 1868.

To the third interrogatory he saith: Henry F. Williams
125 laid it about 1868. It was composed of redwood codrwood, cut into lengths of about three inches; there was no grading done, the blocks being laid on the planks, then hot asphaltum and coal tar were poured on to fill up the crevices, while hot gravel was spread over the top.

To the fourth interrogatory he saith: I have answered fully in interrogatory third to the best of my knowledge.

To the fifth interrogatory he saith: I know nothing further.

WILLIAM HENRY.

Subscribed and sworn to before me this 12th day of January, A. D. 1878.

E. H. THARP,
Notary Public and Commissioner.

WILLIAM REED, being first duly sworn to speak the truth, the whole truth, and nothing but the truth, deposes and says as follows:

126 To the first interrogatory he saith: My age is 66 years; I reside in Oakland, Alameda co., Cal.; for the past eleven years I was toll collector at the Mission Bay bridge; at present I am doing nothing.

To the second interrogatory he saith: I remember the pavement; it was laid about the year 1868.

To the third interrogatory he saith: A man by the name of Perry put the pavement down—that is, he bossed the job. There was no grading done, it being laid right on the planking of the bridge. It was composed of pieces of redwood, cut into lengths of about three inches—it may have been four inches—and then placed endwise on the planking of the bridge; then fine gravel was put on and swept with a broom into the crevices between the blocks; and then hot asphaltum was poured on top of the gravel, that completing the road.

To the fourth interrogatory he saith: The wood used was redwood cordwood of four feet long, cut into quarters lengthwise, and then sawed into pieces about three or four inches long. I have answered the question fully in the third interrogatory.

To the fifth interrogatory he saith: I know of nothing else.

127 WILLIAM REED.

Subscribed and sworn to before me this 14th day of January, A. D. 1878.

E. H. THARP,
Notary Public and Commissioner.

HENRY F. WILLIAMS, being first duly sworn to speak the truth, the whole truth, and nothing but the truth, deposes and says as follows:

To the first interrogatory he says: I am 50 years old; I reside in San Francisco, and my occupation is real estate agent.

To the second interrogatory he says: I know of such a pavement having been laid on the Mission Bay toll bridge in this city.

To the third interrogatory he says: I laid the pavement—or I should say, it was laid under my direction and supervision. It was laid in the year 1868. I took timber suitable for common
128 cordwood and cut it into short lengths of about four inches, and laid it upon the planking of the bridge, with the grain vertical—that is, the blocks on end—and as compactly as the irregular shape of the blocks would permit; and then the crevices between the blocks were filled with fine gravel; and then a composition of hot coal tar and asphaltum was poured over the whole surface of the pavement, the length of the pavement laid being about half a mile.

To the fourth interrogatory he says: Redwood cordwood was used in the manner I have stated in answer to third question. Fine gravel and coal tar and asphaltum were the substances used in filling up the crevices, and the coal tar and asphaltum while hot were poured on the surface, and then fine sand and gravel spread over that.

To the fifth interrogatory he says: I know of nothing.

To the first cross-interrogatory he says: The pavement was in use several years, and was then removed and planks substituted. I did not lay any pavement like it.

To the second interrogatory he says: The pavement was laid on the ordinary planking of the bridge, the blocks being placed on the planks.

129 To the third cross-interrogatory he says: The bridge was an uncovered one.

To the fifth cross-interrogatory he says: There was a composition used of coal tar and asphaltum. It was used while in a melted state, and poured over the pavement.

To the sixth cross-interrogatory he says: I did not. Because my views upon the paving question underwent considerable about that time. I made an application for a patent for that kind of pavement in 1868, but my application was denied, and I did not follow the matter up, because I became convinced it would not be of much use if obtained.

HENRY F. WILLIAMS.

Subscribed and sworn to before me this 18th day of February, A. D. 1878.

E. H. THARP,
Notary Public and Commissioner.

STATE OF CALIFORNIA, } ss.
City and county of San Francisco, }

I, E. H. Tharp, the commissioner named in the annexed commission, do hereby certify that I caused to be examined the said
130 Henry F. Williams, Chas. D. Wheat, Robert P. Kelly, William Henry on the interrogatories annexed and in the case mentioned in said commission. That I first administered to each of said witnesses an oath, and swore them that the answers to be given by him to the interrogatories annexed to the said commission should be the truth, the whole truth, and nothing but the truth. That the answers as given by each were reduced to writing by a disinterested person, that then the same was read to said witnesses, and was then signed by him. That said witnesses were examined by me and their depositions taken on the days following: Chas. D. Wheat on the 3rd of January, 1878; Robt. P. Kelly on the 11th of January, 1878; William Henry on the 12th day of January, 1878; William Reed on the 14th day of January, 1878; Henry F. Williams on the 18th day of February, 1878.

Dated at San Francisco this 19th day of February, A. D. 1878.

E. H. THARP,
Commissioner and Notary Public.

Witnesses' fees @ $2.00	$10 00
Subpœnas @ $1.00	5 00
Service @ $1.00	5 00
Cost of depositions, commissioner	25 00
	$45 00

131 *Commission.*

The Circuit Court of the United States for the eastern district of Michigan, in chancery.

STATE OF MICHIGAN, WAYNE COUNTY, *ss.*

The President of the United States of America to E. V. Sutter, of San Francisco, in the state of California, greeting:

Know ye, that in confidence of your prudence and fidelity, the said Circuit Court of the United States for the eastern district of Michigan, in chancery, has, by a rule entered upon the records thereof in a certain cause now pending in said court, wherein Robert C. Phillips, Eugene Robinson, and Jesse H. Farwell are complainants and the City of Detroit is defendant, and now at issue, hath nominated and appointed, and doth by these presents nominate and appoint you, and will give unto you full power and authority to examine upon oath, or affirmation, Henry F. Williams, Charles D. Wheat, Robert P. Kelly, William Reed, and William Henry, of San Francisco, California, witnesses to be produced, sworn, and exam-

ined on the part and behalf of said defendant, upon certain written interrogatories hereto annexed, and we therefore command you that at a certain day and place, to be by you appointed, you do cause the said witnesses to come before you, and then and there examine them and each of them, on his oath or affirmation, first taken be-
132 fore you (which oath or affirmation you may administer), touching the matters and things referred to in said interrogatories; and that you cause the examination of said witnesses to be reduced to writing, and to be subscribed by each witness, which examination is also to be certified you *you*. And when you shall have so taken the said depositions, you are to annex the same, with any exhibits produced and proved before you, to this commission, and to return the same unto said court, according to the direction of this commission. And you are in all things to be governed in the premises by the instructions hereto annexed.

Witness the Hon. Morrison [R. Waite], chief justice of the Supreme Court of the United States, this twelfth day of March, in the year of our Lord one thousand eight hundred and seventy-seven.

ADDISON MANDELL,
Clerk.

D. C. HOLBROOK,
Sol'r for Def't.

133 In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Eugene Robinson and Jesse H. Farwell
vs.
The City of Detroit.
} In equity.

Direct interrogatories to be propounded to Henry F. Williams, Charles D. Wheat, Robert P. Kelley, William Reed, & William Henry, of San Francisco, in the state of California, on the part of the defendant:

First direct interrogatory. What is your age, where do you reside, and what is your occupation?

Second direct interrogatory. Do you know of a pavement composed of wood and sand being laid in the year of 1867 or 1868 along the roadway of a bridge called the Mission Bay toll bridge, in the city of San Francisco, in the state of California?

Third direct interrogatory. If you answer the second interrogatory above in the affirmative, answer who laid such pavement, when was it laid, describe how it was made, and if any grading of the road was made how was it done, if any subtance was then laid in the ground after the road was graded what was the substance first laid, then what next and so on till the road was completed?

134 Fourth direct interrogatory. If any wood was used, state in what form it was used, how formed, and how were the spaces between the wood filled up, and what with, and if any substance was spread over the wood what was it and how spread?

Fifth direct interrogatory. Do you know any other matter or thing which may tend to the benefit of the defendant in this matter; state fully?

D. C. HOLBROOK,
Sol'r for Def't.

135 In the Circuit Court of the United States for the eastern district of Michigan.

R. C. Phillips
vs.
The City of Detroit. } In Equity.

Cross-interrogations for the examination of Henry F. Williams.

1. What was the extent of the pavement laid by you in the Mission Bay bridge?
2. What became of that pavement, and did you ever lay any more like it?
3. What was the pavement laid upon; what was under it?
4. Was it a covered bridge?
5. Was any tar or composition used in laying the pavement, and if so, how was it used?
6. Did you follow up the laying of that pavement by any further experiments or use of it, and if not, why not?

136 In the Circuit Court of the United States for the eastern district of Michigan. In Equity.

Robert C. Phillips, Eugene Robinson, and Jesse H. Farwell }
vs.
The City of Detroit }

A commission with written interrogatories having been issued to E. V. Sutter as commissioner, and he having refused to act as such commissioner, the parties hereto consent that such commission may be executed by any commissioner or master of the Circuit Court of the United States in San Francisco, California, or any notary public residing in said city. The examination of the witnesses to be upon the written direct and cross-interrogatories attached to said commission.

Cincinnati, Ohio, Oct. 18, 1877.

D. C. HOLBROOK,
Sol'r for Def't.
STALLO & KITTREDGE,
Sol'rs for Compl'ts.

(Endorsed:) Received from P. O. Feb. 27, 1878, and opened and filed in open court Oct. 1, 1878; A. Mandell, clerk.

137 *Depositions for defendants.*—Filed July 13th, 1878.

In the Circuit Court of the United States for the eastern district of Michigan. In equity.

Robert C. Phillips, Eugene Robinson, and Jesse H. Farwell
vs.
The City of Detroit.

To Messrs. STALLO & KITTREDGE and GEO. H. LOTHROP, esqrs.,
Solicitors for complainant.

Take notice that on Monday next, the 11th day of June, instant 1878, at 10 o'clock in the forenoon of that day, the deposition of John W. Monday of the city of Chicago, Illinois, will be taken on behalf of the defendants in the above cause, before Philip A. Hoyne, esq., a commissioner and examiner of the Circuit Court of the United States for the northern district of Illinois, at his office in the city of Chicago, Illinois, at which time you can attend.

Yours, &c.,
F. A. BAKER,
Sol'r for Def't.

Detroit, June 5, 1878.

Service of the above notice admitted this 5th June, 1878.
GEO. H. LOTHROP,
Sol'r for Compl'ts.

138 United States of America.

NORTHERN DISTRICT OF ILLINOIS, CITY OF CHICAGO, COUNTY OF COOK, *ss.*

Be it remembered that on this 11th day of June, in the year of our Lord one thousand eight hundred and seventy-eight, I, Philip A. Hoyne, a commissioner duly appointed by the Circuit Court of the United States for the northern district of Illinois, in the seventh circuit, under and by virtue of the acts of Congress entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the "United States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States,'" passed March 1st, 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th, 1789, *did* call and cause to be and personally appear before me at my office at rooms 21, 157 and 159 La Salle street, in the city of Chicago, in the said northern district of Illinois, in the state aforesaid, John W. Mundy to testify and the truth to say, on the part and behalf of the defendant in a certain suit or matter of controversy now pending and undetermined in the Circuit Court of the United States for the eastern district of Michigan, in equity,

at the city of Detroit, in the state of Michigan, wherein Rob-
139 ert C. Phillips, Eugene Robinson, and Jesse H. Farwell are complainants, and the city of Detroit is defendant.

And the said John W. Munday, being about the age of thirty-four years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth in the matter of controversy aforesaid, I did carefully examine the said John W. Munday, and he did thereupon depose, testify and say as follows, viz:

Being interrogated by L. L. Bond, esq., for the defendant, the witness says:

Interrogatory first. Please state your name, your age, place of residence and occupation?

Answer. My name is John W. Munday; my age is 34 years; I reside in Chicago, Illinois, and am at present practicing law, and make a specialty of patent suits; I am also a solicitor of patents, and have been in that business about nine years.

Int. 2. What opportunity have you had for becoming familiar with mechanics' patents, patented improvements generally, and particularly what opportunities have you had for becoming familiar
140 with wood and other improvements, and say whether or not you have ever before been called upon to testify as an expert in patent cases?

A. I have from a natural taste in that direction made a special study of mechanical appliances, and for the last nine years my business of soliciting patents has thrown me constantly in contact with inventors and labor-saving inventions of all kinds. I have obtained two patents for inventions of my own. I have been called to testify as an expert in a great many patent suits; among others in a patent suit between Mr. H. W. Stow and the city of Chicago, involving patented improvements in street pavements, which has been recently decided.

Int. 3. Have you examined and are you familiar with the letters patent No. 121,544, to Robert C. Phillips, for an improvement in wooden pavements, dated Dec. 5, 1871, said patent being the complainants' patent in this case.

A. I have examined the printed copy of that patent and understand it.

Int. 4. What invention or improvement in pavements do you find described in said patent and summed up in the summary or claim thereof?

A. After a careful consideration of this document, I am constrained to say that I do not think there is any invention claimed.
The thing described is a wooden pavement for streets and
141 highways; a foundation or bed of broken stone and gravel or sand, or either of these materials, is first prepared, and upon this is placed a flooring of blocks of wood or, more properly, lengths sawn from trees or branches; these pieces of uniform length are placed upon end on the foundation, and the interspaces filled with

gravel or sand, then the whole thing is compacted by ramming and rolling in the ordinary way. I omitted to mention that the bark is removed from the blocks. The thing claimed is best stated by quoting the claim, as follows:

"A wooden pavement, composed of blocks of any desired wood cut from the trunks or branches of trees or saplings, of any desired length, in their natural form, the bark only being removed, placed with their fibres vertical, upon a bed of broken stone and gravel, or sand, or either of them, the spaces between the blocks being filled with gravel or sand, the whole made compact by ramming, rolling, or other proper method, as herein shown and described."

Int. 5. Have you examined and are you familiar with the several English and American patents heretofore exhibited in this case and marked respectively Defendant's Exhibits A, B, C, D, E, F, H, J, K, M, and N?

A. Yes, sir.

Int. 6. Please take them up in such order as you may choose, and state what pavement you find described in any or either of
142 them which is like or substantially like the pavement described in complainants' said patent, and give your reason for any opinion or opinions you may express?

A. In order to answer this intelligently and connectedly, I will state again the thing described in the Phillips patent: This Phillips pavement contemplates that the blocks shall be cut from trees in their natural form with their bark removed and shall be set with the grain vertical directly upon a sand or gravel foundation, and shall have the interspaces filled with sand or gravel.

First, as to the blocks cut in their natural form from trees—this idea is found clearly suggested as far back as A. D. 1841, in the English patent of Reynolds, Exhibit "D," which says that one of the improvements "consists in constructing the roadway with pieces of the trunks of trees cut into suitable lengths, as from three to ten inches, and placed with their fibres vertical, side by side in their natural state, without being cut or hewn into any particular shape."

The English patent to Thomas Parkin, Defendant's Exhibit "J," shows at figure 30 of the drawing a pavement composed of a lot of round blocks of unequal sizes, evidently in their natural form, and set upon end with their grain vertical; I may also mention in this connection, as going to indicate that such blocks were well
143 known in the prior art, that in the reported case of Stead against Williams, found in the second volume of Webster's Patent Cases, the court mentions the fact that it had been proved to be common in a certain county in England to make a pavement of the limbs of trees in their natural form, set upon end and driven into the foundation of sand.

Next as to the foundation, which the Phillips patent says shall be of sand or stone or gravel and the blocks shall be laid directly upon it. This is the common way of laying brick pavement; all brick pavement that I know anything about is laid directly upon the sand,

so that the water which soaks into the brick can drain away without danger of heaving the brick with the frost; the crevices between the bricks are also filled with sand if any crevices exist, because sand is commonly strewn over the pavement after it is laid.

It is common, and has been so far back as my knowledge goes, to lay cobble-stone pavement directly upon the common sand and gravel foundation. I mention these facts because it does not seem to me in view of their being known to everybody hardly necessary to refer to the English and American patents. For instance:

The English patent of McCarthy, A. D. 1825, Defendants' Exhibit "N," shows blocks of "stone or any other material or
144 materials, whether natural or artificial," laid directly upon the ground. He says also that the spaces between the blocks may be filled with gravel or sand.

Patent to Stead, Exhibit "A," shows blocks of wood laid with the fibres vertical directly upon the roadway. Patent to Stead, A. D. 1838, Exhibit "B," shows blocks of wood set with the fibres vertical directly upon the roadway. He says "the surface of the road * * * is to be prepared in as solid a condition as possible * * and the blocks are successively to be applied, having sand or other fine filling," and also, above, that "the blocks of wood are to be placed on the earth or formed with the grain of the wood in a vertical position." He says also that melted pitch may be employed with the sand, "though this is not essential."

The patent of A. D. 1844 to Fountaine Moreau, Exhibit "E," shows blocks of wood cut from the tree. He says "any log of wood may be used." The bark is off presumably, judging from the drawing; these blocks are set vertically upon a layer of sand.

Patent of Parkin, A. D. 1843, Exhibit "J," shows blocks of wood set vertical upon a concrete foundation, with the interspaces or crevices filled with cement "or gravel and sand." Parkin shows as I have before stated the round blocks cut from trees in their natural state. Patent to Wood, A. D. 1840, Exhibit "K," shows
wooden blocks set on end with the grain vertical upon a
145 foundation of shingle, gravel or sand.

Patent of U. S. to Brown, April, A. D. 1870, shows a pavement made of wooden blocks set with the grain vertical directly upon the ground, and the crevices filled with earth and gravel rammed.

It will be seen from this short statement of the prior art that Mr. Phillips did not invent the peculiar kind of block used in his patent, and also that he was not the inventor of the foundation mentioned in his patent, and also that he was not the first to fill the crevices with sand and gravel, nor was he, as it appears from the above, the first one to make a pavement composed of wooden blocks set on end with such a foundation and such a filling. Indeed, it is unnecessary to go outside of his own patent to discover this, because he says in his own patent, "I do not claim broadly the use of wooden blocks in the state in which they are cut from the tree or branches; nor yet do I claim the foundation of stone or gravel and the filling of the

spaces between the blocks with sand or gravel separately considered."

If this kind of a pavement was old, and this kind of block was old, I cannot see what Mr. Phillips did that was new. He put the old block on the old foundation, and filled it with the old filling in the old way, and therefore I conclude that there was no invention exercised in making this pavement. Let us suppose, for example,
146 as it appears from the prior art, that wooden blocks of indeterminate form had been set on end upon the ground and the interspaces filled with sand and gravel, what exercise of ingenuity would be required in making the same pavement of blocks of a particular form?

There might be invention in such a case, but it would be confined to the form of the block, and would not extend to the pavement.

The form of the block is not Mr. Phillips' invention, and if first used by him could scarcely be called invention, because the only result produced by using the naturally formed blocks is to produce a cheaper pavement, and this is due to the cost of the material, and not to any discovery by Mr. Phillips, who did not discover the self-evident fact that wood in its natural condition is cheaper than after it has undergone some process of manufacture. There are possibly certain advantages attending this form of pavement. For instance, the foundation and filling between the blocks being of a porous material permits the water to drain away from the blocks, but this advantage is in nowise dependent upon the fact that said blocks are made directly from the tree; and this advantage is found in all of the other pavements in which the blocks are placed directly
147 upon the ground and the interspaces filled with sand or gravel. In fact the same advantage resulting from the same construction is found in every brick pavement. If no crevices were left between the bricks the water would not run off so fast, but would soak directly into the bricks, and if the foundation under the bricks was not also porous the water would stay there, and the bricks would rot, and the first frost would heave them out of place and thus destroy the pavement. For this reason—because the bricks are porous such pavements are not laid in concrete or mortar, except in cellars where the rain does not fall, but where the moisture comes, if any, from below.

Int. 7. Can you give a summary or analysis of the matters contained in your previous answers, so as to present a condensed view of the matters involved in this suit? If you can, please do so.

A. I will try.

Analyzed, the Phillips patent pavement consists of three elements—

1st. Blocks.

2nd. Foundation.

3d. Filling between the blocks.

The blocks are of wood as to material, and are placed upon end as a condition, and are round or cylindrical as to form.

These are all the peculiarities of the block which affect the
148 completed pavement. Because the mere fact that the round blocks grew into that shape is a matter previous to the completed pavement.

The foundation is the ordinary McAdam road bed, with six inches or more of sand on top. But this peculiarity, if it is such, is waived by the claim, which says the bed may be of sand.

The spaces between the blocks are filled with gravel or sand, and the whole is rammed or otherwise compacted.

As an example of the prior art, take the Stead patent, Exhibit "A," and especially the pavement at figures 16 & 17, which show a pavement formed of a series of circular blocks or cylinders of wood; whether they grew so or were made so is immaterial, because that is all anterior to the completed pavement. These wooden cylinders are laid directly upon the ground, and the interspaces are either left empty or are filled up. Here are the three elements, and so far as I can see the same pavement substantially as that claimed by Mr. Phillips; Stead shows the blocks, the foundation, and the filling between the blocks, substantially the same as claimed by Phillips.

Int. 8. In reference to the blocks, what is the depth of the space of the interspaces between them? and how are those spaces to be filled in the Stead pavement shown in Figure 16?

A. The interspaces extend from the top of the block to the
149 foundation, and the patentee say that they may be either filled with wooden pieces suited to their shape, or filled up with cement or asphalt, as may be found convenient." Then, further along, says, if they are not too large, they may be left open when the pavement is on an incline.

Int. 9. From the drawings, Figures 16 & 20, Stead patent, Exhibit "A," what material do you understand to be covered by the term "asphalte"?

A. From the manner of representing the filling in these figures, 16 & 20, by means of dots and irregular short pen marks, I should think something like grout was intended, or possibly cement and gravel, or broken stone and some kind of asphalt cement. It has been suggested to me that the word "asphalte" had at that time a different signification from what it now has, and that it was sometimes used to signify a mixture of fine stone or gravel and some bituminous matter. If this is so, it would go a long ways toward explaining the peculiar appearance of the filling in the drawing.

Int. 10. As the complainant's patent is analyzed by you, please state to what extent, if any, you find the elements and conditions of that analysis in the Stead A. D. 1838 patent, Defendants' Exhibit "B"?

A. This patent, Stead Exhibit "B," as I before said in my long answer, is formed of wooden blocks, placed with the grain vertical directly upon the ground, and the spaces, if any, between the
150 blocks; inventor says, may be filled with fine sand. Here are the three elements: The earth or porous foundation, the

sand or porous filling, and the porous wooden blocks. Of the Phillips patent, as to whether the blocks shall be round, or square, or six-cornered, or have the bark on or off, or whether or not broken stone may be used as a part of the foundation, are matters properly left to the good judgment of the person who lays the pavement.

Int. 11. How does the Reynolds patent, Defendants' Exhibit "D," compare with the patent of the complainant, as analyzed by you?

A. This Reynolds pavement, as shown at Figure 13 in the drawing, does not differ in any respect from the Phillips patent, except in the material used to fill the spaces between the blocks, because I understand the description, taken altogether, to mean that these pieces of the trunks of trees, with their fibres vertical, as shown in Figure 13, are placed directly upon the ground; the spaces between the blocks, he says, may be filled with cane, rattan, bamboo, or fibres of broom, or such like materials, compressed together with their fibres vertical, or they may be filled with broken stone, cemented into a mass by concrete or asphalt.

Cross-examination by J. H. PHILLIPS, esq.:

x-int. 1. What is asphalt?

151 A. I understand it to be a compound of bitumen with Portland cement, or with some natural friable earth. There is a material largely used in France for paving roads, called asphalte. I think it is found in France in a natural state.

x-int. 2. As an expert, is that your definition of asphalt?

A. I do not understand that asphaltum is meant by this term; perhaps I may be wrong about this, but my impression is quite clear that the term "asphalte," which is the French for asphaltum or bitumen, is used even in France to mean a compound of bitumen and some friable earth or disintegrated stone. As an expert, I have no definition of the term asphalte, and as I have not critically or otherwise examined the dictionaries I do not feel competent to give an exact definition of the term, nor have I undertaken to do so.

JOHN W. MUNDAY.

Subscribed and sworn to before me this 11th day of June, A. D. 1878.

[SEAL.] PHILIP A. HOYNE,

U. S. Commissioner in and for the northern district of Illinois.

Counsel for defendant offers in evidence a certified copy of a specification and drawing in the matter of the application of

152 H. F. Williams for a patent for improvements in wood pavement, filed June 10th, and request the same to be marked "Exhibit Williams."

Said paper writing is marked "Exhibit Williams."

Further proceedings under this notice are hereby closed.

153 UNITED STATES OF AMERICA, } ss.
Southern district of Illinois, }

I, Philip A. Hoyne, a commissioner duly appointed by the Circuit Court of the United States for the northern district of Illinois, in the seventh circuit, under and by virtue of the acts of Congress entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States,'" passed March 1st, 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th, 1789, do hereby certify that the reason for taking the foregoing deposition is, and the fact is, the witness is material and necessary in the cause in the caption of the said deposition named, and that the same was taken in pursuance of the annexed notice, and that the said witness John W. Munday resides in Chicago, Illinois, more than one hundred miles distant from the city of Detroit, in the state of Michigan, where the trial of said cause is expected to take place is appointed by law to be held.

I further certify that on the eleventh day of June, in the year of our Lord one thousand eight hundred and seventy-eight, I
154 was attended by L. L. Bond, esq., att'y for defendant, and by J. H. Phillips, esq., for the complainants, and by the witness, who was of sound mind and lawful age, and the witness was by me first carefully examined and cautioned, and sworn to testify the truth, the whole truth and nothing but the truth, and the deposition was by me reduced to writing in the presence of the witness and from his statements and after carefully reading the same to the witness he subscribed the same in my presence. I have retained the said deposition in my possession for the purpose of mailing the same with my own hands to the clerk of the Circuit Court of the United States for the eastern district of Michigan, at Detroit, Michigan, the court for which the same was taken.

And I do further certify that I am not of counsel nor attorney for either of the parties in the said deposition and caption named, nor in any way interested in the event of the cause named in the said caption.

In testimony whereof I have hereunto set my hand and seal this eleventh day of June, in the year of our Lord one thousand eight hundred and seventy-eight, and of the independence of the United States the 102d.

PHILIP A. HOYNE,
United States Commissioner, duly appointed by the Circuit
155 *Court of the United States for the eastern district of Illinois, in the seventh circuit.*

Commissioner's fee, $10.00. Paid by def't.

P. A. H.

(Endorsed:) Filed July 13th, 1878. John Graves, dep. clk.

156 *Note of Issue.*

State of Michigan. In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Eugene Robinson & Jesse H. Farwell
vs.
The City of Detroit.
} In equity.

OCTOBER 24, 1878.

The above-entitled cause will be brought on for trial at the next term of this court, notice having been served on the part of the defendant on Geo. H. Lathrop, esq., & Stallo & Kittredge, sol'rs for the complainant, according to the statute and rules of this court. You will please place said cause on the issue docket of this court for said term, 4th class, on pleadings and proofs.

This cause notice for

F. A. BAKER,
Sol'r for Def'ts.

(Endorsed:) Filed Oct. 24, '78; A. Mandell, clk.

157 *Note of Issue.*

United States of America. In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Eugene Robinson & Jesse H. Farwell
vs.
The City of Detroit.

The above-entitled cause will be brought on for hearing on pleadings and proofs at the next term of court.

You will please place said cause on the equity docket of this court for said term.

D. D. HOLBROOK,
Solicitor for Defendant.
GEO. H. LOTHROP,
Sol'r for Complainants.

To the Clerk of said court: Please put this case in the calendar.

GEO. H. LOTHROP,
Sol'r for Compl'ts.

(Endorsed:) Filed this day of February, A. D. 1879; A. Mandell, clerk.

158 [Filed April 21, 1879.]

The United States Patent Office.

To all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records

of this office of the letters patent granted Robert C. Phillips, dated December 5th, 1871, No. 121544, for improvement in wooden pavements.

In testimony whereof I, J. M. Thacher, acting commissioner of patents, have caused the seal of the patent office to be hereunto affixed this second day of July, in the year of our Lord one thousand eight hundred and seventy-two, and of the independence of the United States the ninety-sixth.

[SEAL.] (Signed) J. M. THACHER,
Acting Commissioner.

No. 121,544.]

The United States of America.

To all to whom these presents shall come:

Whereas Robert C. Phillips, of Cincinnati, Ohio, has presented to the commissioner of patents a petition praying for the grant of letters patent for an alleged new and useful improvement in wooden pavements, a description of which invention is contained in the specification of which a copy is hereunto annexed and made a part hereof, and has complied with the various requirements of law in such cases made and provided; and—

Whereas upon due examination made the said claimant is adjudged to be justly entitled to a patent under the law—

Now, therefore, these letters patent are to grant unto the
159 said Robert C. Phillips, his heirs or assigns, for the term of seventeen years from the fifth day of December, one thousand eight hundred and seventy-one, the exclusive right to make, use and vend the said invention throughout the United States and the territories thereof. In testimony whereof I have hereunto set my hand and caused the seal of the patent office to be affixed, at the city of Washington, this fifth day of December, in the year of our Lord one thousand eight hundred and seventy-one, and of the independence of the United States of America the ninety-sixth.

(Signed) B. R. BOWEN,
Acting Secretary of the Interior.

Countersigned:

M. D. LEGGETT,
Commissioner of Patents.

121,544.]

United States Patent Office.

Robert C. Phillips, of Cincinnati, Ohio.—Improvement in Wooden Pavements.

Specification forming part of letters patent No. 121,544, dated Dec. 5, 1871.

To all whom it may concern:

Be it known that I, Robert C. Phillips, of Cincinnati, in the county

of Hamilton and state of Ohio, have invented a new and useful improvement in street and other highway pavements, of which the following is a specification: My improvement consists mainly in the use of wood of any suitable kind in its natural or undress state; that is, in the form of round blocks or sections of small trees or the branches of trees from which the bark has been removed,
160 cut as nearly at right angles to their length as may be, generally in lengths of about six inches, their diameters varying from three to twelve inches. These are placed upon end upon a bed or foundation composed of a stratum or layer of broken stone about eight inches deep, upon which a course of coarse sand or gravel of, say, six inches in depth is spread, the whole properly rolled or rammed so as to be solid and presenting an even or uniform surface for the blocks to rest upon. Upon this surface the blocks are placed upon end, as nearly together as may be, in such manner as to form an even or uniform surface. They are then rolled or rammed heavily so as to force them well down upon the bed. The spaces or openings between the blocks are then filled with good, hard, coarse gravel and sand and again rolled or rammed, after which the whole is covered with gravel or sand to a depth of about one inch, when the travel may be turned on. As stated above, these blocks may be composed of any suitable wood, but locust is preferred. White oak, white cedar (arbor vitæ), chestnut, yellow pine and others afford good material. The blocks may be used as they come from the forest, or they may be treated by any of the processes commonly applied to render woods hard and prevent decay, such as burnetizing, creosoting, &c. Thus the wooden portion of the pavements is composed of blocks cut from the tree or branch of a tree in its natural state, the bark only being removed, and as above stated may be of any size from three inches upward. Blocks of large size may be split in half or other parts when the situation may require a flat or straight side, as along a line of curb, a rail or similar position.
Figure 1 is a plan of a portion of a street paved with my
161 rough blocks together with a portion of the curb. Fig. 2 is a vertical section showing a portion of a street paved with these blocks, with a rail track and the bed of broken stone, with the covering of gravel as usually put down; and Fig. 3 is a section of a street thus paved from curb to curb with a rail track in the center. I thus produce a pavement which can be laid as easily and with less expense than cobble-stone pavement, and which has been found in practice to be more durable than the most approved wooden pavements hitherto in use. I do not claim broadly the use of wooden blocks in the state in which they are cut from the tree or branches; nor yet do I claim the foundation of stone or gravel and the filling of the spaces between the block with sand or gravel separately considered; but

What I do claim as my invention and desire to secure by letters patent is—

A wooden pavement composed of blocks of any desired wood, cut

R. C. Phillips. Wooden Pavement

No. 121,544. Patented Dec. 5, 1871.

No. 3465
Phillips
v.
City of
Detroit

Page 161.

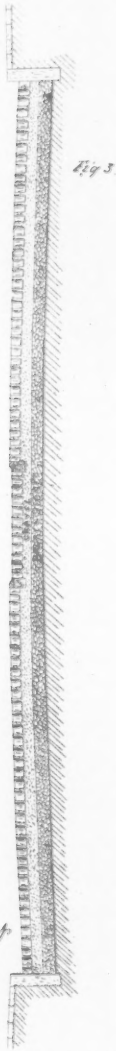


Fig 3.

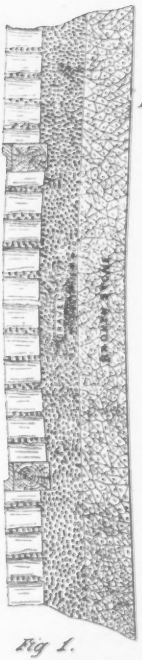
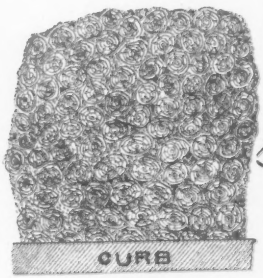


Fig 2.

Fig 1.



R. C. Phillips

Albert E. Tripp
Harry Bladburne

from the trunks or branches of trees or saplings of any desired length in their natural form, the bark only being removed, placed with their fibers vertical upon a bed of broken stone and gravel or sand, or either of them, the spaces between the blocks being filled with gravel or sand, the whole made compact by ramming, rolling or other proper methods, as herein shown and described.

(Signed) ROBERT C. PHILLIPS.

Witnesses:
ALBERT E. TRIPP.
HARRY BLACKBURN.

162 (Here follows diagram marked page 162.)

163 The Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Eugene Robinson & Jesse H. Farwell
vs.
The City of Detroit.

29th day of October, 1878, before Charles Flowers, U. S. commissioner.

Testimony taken on the part of the complainants at Detroit on the

Present—D. C. Holbrook, counsel for the defendant; Geo. H. Lothrop, solicitor for the complainants.

It is admitted by the counsel for the defendant that a wooden pavement, in which the blocks are laid upon a sand foundation and the spaces between the blocks filled with sand or gravel, is better or more durable than a wooden pavement composed of the same kind of blocks laid upon a foundation of boards or any other substance which makes a nearly water-tight foundation.

ALEXANDER L. PATRICK sworn for complainants:

Examined by Mr. LOTHROP:

Q. You live in the city of Detroit, and have lived here how long?

A. A little over 19 years.

Q. What is your present business, and how long have you been engaged in that business?

A. I am contractor; have been in the paving business about eleven years and at present partly engaged in the paving business, and part of my time devoted to the running of odorless excavating apparatus.

Q. Will you state about how much of your time during the
164 last 7 years you have devoted to repairing wooden pavements in the city of Detroit, and what different kinds of pavements, giving their names, you have repaired during that time?

A. I have been during that time earning my living principally at that business, and each year I have been more or less connected with it. Two of those years during that period I did about all the

repairing that was done for the city, for the two gas companies, for the sewer commissioners, water commissioners, and private individuals.

Q. Will you give the names of the different pavements?

A. Every known pavement put down in Detroit I have repaired more or less.

Q. Are you acquainted with the wooden pavement on Hastings street, between Franklin and Atwater streets; if so, state what kind of pavement that is and when it was laid?

A. That is a round cedar block laid upon sand or ingredient of that kind, with gravel filled in between and sand on top. I think it was laid in 1872 or 1873.

Q. Have you examined that pavement recently; if so, when did you examine it and what condition is it in?

A. I was on it yesterday afternoon, I was on it this morning, and it has every appearance of being in very good condition.

Q. State whether or not you examined it so as to be thoroughly satisfied as to its condition?

A. I did not take up any blocks, but from its appearance from being on the street I would say it was in very good condition. If there was anything the matter with it it would show on its surface to some extent.

Q. Is it at all broken up?

A. No, sir.

165 Q. Are you acquainted with the pavement on Elmwood avenue in the city of Detroit; if so, what kind of pavement is it and when was it laid?

A. I ought to know pretty well about that street; it cost me enough money in the first place to lay it. I live on that street. That street commenced to go to pieces the second year after it was laid, which was in 1872, I think.

Q. What kind of pavement?

A. The Ballard pavement laid upon sand.

Q. Please describe the Ballard pavement.

A. It has a rectangular block square of pine grooved on the side so as to lock into each other, and consequently brings the wood tight up against each other, making a solid wooden pavement laid on sand.

Q. What is the present condition of that pavement?

A. Where it has not been displaced with cedar it is in very dilapidated condition.

Q. Are you acquainted with the pavement on St. Aubin avenue in this city?

A. Yes, sir.

Q. What kind of pavement is that?

A. That is a Ballard pavement also.

Q. When was that laid?

A. After the pavement put down on Elmwood avenue; I think in 1873.

Q. If you know the present condition of that pavement state what it is.

A. It is in very bad condition.

Q. Do you know how the amount of travel on Hastings street compares with the amount of travel on Elmwood avenue?

A. There is probably as much travel in the one place as the other, only the travel on Hastings street is with heavy teams from
166 the Milwaukee and Michigan Southern Railway. On Elmwood avenue there is probably as much travel, but with light vehicles going to and from the cemetery.

Q. How is it with St. Aubin avenue?

A. On St. Aubin avenue there is considerable travel, but not to the extent of either Elmwood or Hastings street.

Cross-examination by Mr. HOLBROOK:

Q. Were you a contractor or had anything to do with laying the pavement on Elmwood avenue?

A. I did not, sir.

Q. You lived on the street and paid your assessment in front of your lot?

A. Yes, sir.

Q. Do you know whether the pavement referred to on Hastings street has been repaired since it was laid?

A. Not that I am aware of—certainly not during the period I was repairing streets for the city.

Q. Do you know whether or not a Ballard pavement is a patented pavement?

A. I can't tell whether any of them, except from what the paper states are claiming royalties.

Q. Do you know whether that pavement was laid according to the specifications?

A. I presumed that it was, or I would have seen that it was, living on the street and paying for it.

Q. You never saw the patent on specifications, did you?

A. I have seen the specifications issued by the public works.
167 Q. I mean the specifications issued by the patentee, annexed to the patent itself?

A. No, sir.

Q. Then you don't know whether that was laid according to the specifications or not?

A. No, sir.

(Signed ALEX. L. PATRICK.

JESSE H. FARWELL sworn for complainants.

Examined by Mr. LOTHROP:

Q. You are one of the complainants in this case?

A. Yes, sir.

Q. You have been paving contractor here for some years?

A. Yes, sir.

Q. Are you acquainted with the piece of so-called Phillips pavement at the foot of Hastings street?

A. I am.

Q. State when that pavement was laid and who laid it.

A. It was laid in 1872 by the Ironizing and Paving Company, of which I was a member.

Q. State whether that pavement to your knowledge has ever been repaired since it was laid?

A. It has not.

Q. What was the first piece of Phillips pavement laid in Detroit?

A. The piece above referred to on Hastings street.

Q. What was the next piece of Phillips pavement laid in the city of Detroit?

A. Upon Clifford street in 1872; the same year as the Hastings street pavement, but later in the season.

168 Q. When was the next piece of Phillips pavement laid in the city of Detroit?

A. In 1874.

(Signed) JESSE H. FARWELL.

HENRY GORDON sworn for complainants.

Examined by Mr. LOTHROP:

Q. You live in the city of Detroit?

A. Yes, sir.

Q. How long have you lived here?

A. 44 years.

Q. What is your business?

A. I have been working for the city for the last three years.

Q. In what capacity?

A. Overseer of the laboring work around the wards.

Q. That embraced the repairing of pavements?

A. No, sir; I have nothing to do with that for the last three years.

Q. What part of the street department have you attended to?

A. Cleaning the streets and grading new-made streets.

Q. Are you acquainted with the piece of round block cedar pavement on Hastings street, between Franklin and Atwater streets?

A. Yes, sir.

Q. Another round piece of the same pavement on Clifford street, in this city?

A. Yes, sir.

Q. Have you examined those pavements recently; if so, when?

A. I have had my eye on them since they were laid; I was down at Hastings street this morning.

169 Q. In what condition is that pavement?

A. In a fine condition, considering the time it has been laid and the travel, which is very heavy at that point.

Q. Have you examined the pavement on Clifford street recently?
A. Not within a week.
Q. What was its condition when you last examined it?
A. A very fair condition.
Q. Are you acquainted with the so-called Ballard pavement on St. Albin avenue?
A. Yes, sir.
Q. Do you remember when that pavement was laid?
A. I think it was laid in 1872.
Q. How recently have you examined that pavement?
A. I have been over that frequently within the last year?
Q. What is the condition of that pavement?
A. Very bad.

Cross-examination by Mr. HOLBROOK:

Q. Why is the pavement on St. Aubin avenue bad?
(Objected to.)
A. I take it because it was laid on boards or made of pine.
Q. Laid on a foundation of wood?
A. No; St. Aubin avenue is not.
Q. What is it laid on?
A. Laid on sand. I have not paid much attention to St. Aubin; it is rather far away for me.
Q. Let me ask why you call it in bad condition?
A. I think it is owing to the rotting of the wood.
170 Q. Have you taken up any of the blocks?
A. No.
Q. Then you can't tell whether it is owing to the rot or the work?
A. I would not like to base an opinion on St. Aubin avenue.
Q. Do you know whether it has ever been repaired in any way?
A. No, sir.

Redirect:

Q. Is the surface of that street smooth or is it full of holes?
A. It is about the same as other streets; they wear into holes, more or less, if disturbed.
Q. What is the condition of that street as to holes?
A. I could not say; I have not been over it in two months, I guess.

(Signed) HENRY GORDON.

GEORGE CRABBE sworn for complainants.

Examined by Mr. LOTHROP:

Q. What is your age?
A. 67.
Q. How long have you lived in Detroit?
A. Since it was a territory.

Q. What is your business?

A. Originally a builder. The last six or seven years I have been more or less city superintendent of paving.

Q. Are you acquainted with a piece of so-called Phillips pavement on Hastings street between Franklin and Atwater?

A. I was there this morning and saw it.

Q. What condition was that in?

A. It looked to be in good condition.

171 Q. Was it worn in holes or smooth?

A. It was smooth—in very fair condition for the time it has been paved.

Q. Do you know how long that pavement has been there?

A. I believe it was paved in 1872.

Q. How long have you been superintendent of paving?

A. Since 1871, when Michigan avenue was paved.

Q. Has that piece of pavement on Hastings street been repaired?

A. I think not; it looked to me as if it had not been repaired.

Q. Are you acquainted with the piece of so-called Chicago free pavement on 12th street north of Michigan avenue, in the city?

A. I think I am.

Q. Do you know how that pavement is laid?

A. Laid diagonally with sand between.

Q. State what kind of blocks it is laid on.

A. I don't know the size of the blocks; they are pine blocks; rectangular.

Q. What kind of foundation?

A. On sand foundation.

Q. Do you know the present condition of that piece of pavement?

A. I think it is indifferent.

Q. Do you know whether there are holes in it or whether it is smooth?

A. My impression is that it has been pretty holy—more holy than righteous.

Q. How often have you had occasion to pass over that piece recently?

A. I occasionally go that way.

Q. How long since you were there?

A. I was along there in a light wagon perhaps six or eight weeks ago.

Q. How does the travel on that street compare with the travel at the lower end of Hastings street?

A. It is light compared with Hastings street.

172 Cross-examination by Mr. HOLBROOK:

Q. Do you know the cause of the pavement on 12th street being indifferent?

A. I think it is from the nature of the timber, being pine. Cedar is the best timber we have for paving purposes, the round blocks.

Q. Do you know whether it is owing to the quality of the timber, or some defect in the foundation?

A. It may be in both. The cedar block has the same foundation as the pine, and that stands much longer in every respect than the pine.

Q. Have you taken up any blocks and examined them?

A. I have seen them taken up and seen them rot from the bottoms. Take the pine on Michigan avenue; it is a mass of rot, and it was only paved one year before Hastings street. It will have to be repaved next year.

(Signed) GEORGE CRABBE.

173 The Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips et al. *vs.* The City of Detroit. } In equity.

Testimony taken on the part of the complainant on the 15th day of November, 1878, by consent of both parties, before Charles Flowers, United States commissioner.

Geo. H. Lothrop appearing for complainants; D. C. Holbrook for the defendant.

ALEXANDER I. PATRICK recalled.

Examined by Mr. LOTHROP:

Q. Since giving your former testimony have you made a careful examination of the pavement on Hastings street between Franklin and Atwater, and the pavement on Clifford street?

A. Yes, sir.

Q. The pavement on both streets is composed of round blocks laid upon sand?

A. Yes, sir.

Q. In what condition did you find those streets?

A. In taking up the blocks I found them in very good condition.

Q. If you have here any of the blocks taken from those streets please identify them and have them marked.

(All this testimony is objected to as incompetent and irrelevant.)

A. These are the blocks from Hastings street between
174 Franklin and Atwater.

(Witness produces some blocks enclosed in a cloth bag, which are marked Patrick Exhibit 1.)

WITNESS: These are the blocks taken from Clifford street almost opposite the engine house.

(Witness produces blocks enclosed in a cloth bag, marked Patrick Exhibit 2.)

Q. Are these blocks fair average samples of blocks in those two pavements?

A. Yes, sir.

Q. Have you examined the pavement on St. Aubin avenue since testifying before in this case?

A. Yes, sir.

Q. That pavement is composed of rectangular blocks laid on sand close together, is it not?

A. Yes; dovetailed.

Q. If you have any of those blocks will you please produce them and identify them?

(Witness produces some blocks enclosed in a cloth bag and marked Patrick Exhibit 3.)

Q. Are these fair average samples from the pavement on St. Aubin avenue?

A. Yes, sir; a sample of the best and a sample of the worst.

Q. Have you examined the pavement on Twelfth street since you testified in this case before?

A. Yes, sir.

Q. That pavement, I believe, from your testimony, is a rectangular block laid upon sand, but not laid close together?

175 A. Yes, sir.

Q. Have you any blocks from that pavement here?

A. Yes, sir; this is taken from the intersection of 12th and Cherry streets.

(Witness produces blocks in a cloth bag, marked "Patrick Exhibit 4.)

Q. Is that a fair average sample of that pavement on 12th street?

A. Yes, sir.

Q. In what condition did you find the pavement on Hastings street and Clifford street?

A. I found from the appearance of the surface that it was in very good condition. I took up two or three square yards, and I did not find a rotten block on either of the streets. They were worn on top a little, but there was no decay on either of those streets.

Q. In what condition did you find the pavement on St. Aubin avenue?

A. I found it in very poor condition, both from its outward appearance and its inward appearance.

Q. In what condition did you find the so-called Chicago pavement on 12th street?

A. I found it also in very poor condition.

Q. Can you give any instances, from your experience as a paver, of the effect of a coating of tar upon paving blocks?

A. I have always found tar an injury to pavement where it is put on, especially where the blocks were submerged in tar.

Q. How was the injurious effect shown?

A. By internal decay in the blocks.

176 Q. If you know of any particular instances where that is so marked as to attract attention, please state.

A. I had the contract for paving Miami avenue—I think it was in

1869, and the specifications called for both the boards and the blocks to be submerged in tar. In 1873 or 1874 my attention was called to that street by numerous resolutions passed in the council to have it repaired, and I generally found the blocks less or more in a very far state of decomposition, and I attributed the decomposition of the blocks on account of their being submerged in tar, their decay from the top as well as from the bottom.

Q. If I understand you correctly you believe a coating of tar induces dry rot?

A. Certainly; because if there is any virtue in the tar it keeps the sap that is in the block from evaporating.

Cross-examination by Mr. HOLBROOK:

Q. What kind of wood was used for the pavement on Hastings and Clifford streets?

A. Round cedar.

Q. What kind of wood was used for all the other pavement that you have mentioned here to-day?

A. The pavement on 12th street and the pavement on St. Aubin avenue was pine.

Q. All the others are pine that you have mentioned except Hastings and Clifford?

A. Yes, sir.

177 Q. They are all laid on sand except the pavement on Miami avenue, which was laid on board and covered with tar?

A. Yes, sir.

Q. What would have been the effect with the pavement on St. Aubin avenue, 12th street, and Miami avenue if the pavement had consisted of cedar blocks?

(Objected to on the ground that the pavement supposed would be the pavement covered by the complainant's patent, and the same pavement as upon the other streets.)

A. Do I understand, from your question, if it had been put down with round or rectangular cedars—if the pavement on 12th street had been put down with rectangular cedar? Is that what you have reference to?

Q. Yes.

A. My impression is if it had been cedar it would not have yet decayed, but would have decayed sooner if time had elapsed, so as to give the cedar a chance to decay, because cedar was put down one year before that, split and on boards, upon part of Woodward avenue, from Brady street north, which has been all taken up this fall.

Q. Why was it taken up?

A. To widen the street.

Q. Did you notice the blocks taken up?

A. I did, some of them.

Q. Any of them decayed?

A. Some of them showed indications of decay.

Q. Not really decayed though?

A. Not bad enough to have torn up the street on account of being rotten.

178 Q. Would they not rot sooner being laid on boards than on sand?

A. I do think so.

Q. Don't you know that every pavement laid upon boards becomes subject to dry rot?

A. Yes, sir.

Q. About what average of time?

A. We have not lived long enough to have experience with cedar. With pine we have.

Q. What time for the pine?

A. I would like to correct myself with regard to pine being laid on sand and pine on boards. I think it will rot as quickly on sand as on boards, from the fact that Miami avenue and St. Aubin and 12th streets show as much indications of decay as pavements done the same year on boards, simply because the wood was split.

Q. Any other reason?

A. No; I do not think I have any other reason. Wood split won't last as long as when it is round.

Q. What was the length of the block on Woodward avenue north of Brady?

A. 5 inches long.

Q. Was that block of the usual length laid?

A. They are laid all the way from 5 inches to 8 inches.

Q. Has it not been demonstrated that a 5-inch block is too short for pavement in this city?

A. That depends entirely upon opinion.

Q. Do you not believe that cedar timber will last longer than pine under the same circumstances?

179 A. I do.

Q. Have you ever known of any cedar that had become subject to dry rot?

A. Yes, sir.

Q. When?

A. In 1874; I had occasion to go into the cedar woods to get out cedar for Second street and various other streets in the city, and some years preceding my going there others had been there before me, and there was quite a pile of cedar left, and the cedar that was left—that was split—was decayed, so that we could not use it, but where it had been left in a round state we used it.

Q. That was in the woods?

A. Yes, sir; piled up ready for shipment.

Q. I mean after it was laid in a pavement?

A. No, sir; as I stated before, none of us have lived here long enough since the pavement has been laid to experience that, although considerable has been down the same length of time the pine has been; the pine has been required to be taken up while the cedar

was good and has been left, as, for instance, on Randolph street north of Gratiot.

Re-direct:

Q. You stated that in 1874 you found a pile of cedar in the woods that had been left there by some previous cutter, and that you could not use the cedar posts that were split, but could use those that were round; please state clearly why you could not use those that had been split.

A. Because they were decayed.

180 Q. State whether or not you found any of these posts, both round and split, piled up in the same pile?

A. The same pile.

Q. Did they have the appearance of all having been put there at one time?

A. I know they were all cut the same time.

Q. Do you know who cut them?

A. I know who cut them; I know they were cut at the same time.

(Signed) ALEX. L. PATRICK.

RICHARD H. COON sworn on behalf of complainant.

Examined by Mr. LOTHROP:

Q. How old are you?

A. 61.

Q. How long have you lived in Detroit?

A. 47 years.

Q. What is your business?

A. Digging up streets and handling blocks.

Q. How long have you been in that business?

A. About 10 years.

Q. Are you acquainted with the pavement in the city of Detroit on Hastings street, between Franklin and Atwater streets?

A. Yes, sir.

Q. Have you examined that pavement recently?

A. I am over it most every day or two.

Q. In what condition is that pavement?

A. Just as good except for natural wear as it was when it was put down.

Q. Did you help put it down?

181 A. I did.

Q. Are you acquainted with the pavement on Clifford street, Detroit?

A. Yes, sir.

Q. How recently have you seen that?

A. I was over that two weeks ago.

Q. Do you know what the present condition of that pavement is?

A. It is good.

Q. Are you acquainted with the pavement on St. Aubin avenue?

A. Yes.

Q. How recently have you seen that pavement?

A. I go over it most every day. I live one block from it.

Q. In what condition is that pavement?

A. When we dug it up a year ago last spring we found it rotten from where it was commenced up to Mullett street. There was a law suit pending between Hilsendagen and Smith, and I was appointed one of three to go and take up blocks. We took it up in three or four places in each block and found it gone. It has been almost all rebuilt by the city since.

Q. Are you acquainted with the pavement on 12th street above Michigan avenue?

A. Yes, sir.

Q. How recently have you seen that?

A. I was over that last week.

Q. What is the condition of that pavement?

A. About the same as St. Aubin avenue. That has been repaired more or less by the city.

Q. Any large proportion of the blocks decayed?

A. Pretty badly gone.

182 Q. In your experience paving streets have you seen the effect of tar upon paving blocks?

A. Yes, sir.

Q. What has been the effect of tar in your experience?

A. I think the more tar used the worse the blocks are. We paved Jefferson avenue from Campan avenue to Miller's garden and the order was to dip all our blocks in tar. We submerged the blocks in tar and took them out and laid them. In 4 years it was full of dry rot.

Q. What kind of pavement is that on Jefferson avenue just beyond the pavement you speak of?

A. That is the same kind of pavement but not dipped in tar.

Q. What is the comparative condition of those two?

A. Both ends of the pavement are better than the middle. From Chene street up to Campan avenue was paved three years before this piece, and that is a better pavement to-day than the one dipped in tar. It is the same kind of pavement, same material, all Nicholson pavement.

Cross-examination by Mr. HOLBROOK:

Q. What kind of wood is the pavement on Hastings street?

A. Cedar blocks on sand.

Q. What kind on St. Aubin avenue, 12th street and Jefferson avenue that you have spoken of?

A. Rectangular pine blocks. Ballard pavement on St. Aubin avenue. A lock block cut in the shape of a Y and put together.

Q. What is the effect of tar upon cedar pavement?

183 A. We never have used any cedar in tar, except to sprinkle a little on top.

Q. You do not know what the effect would be?

A. I don't know what the effect would be by dipping it in tar.

Q. Which is the better wood for pavement, cedar or pine?

A. I should prefer cedar.

Q. Have you known cedar pavement long enough to know how long it will take to wear it out in a well-travelled thoroughfare?

A. The Hastings street block is the first pavement laid in the city on sand or any cedar. That has been down since 1872, and there has been a large travel over it from the Detroit and Milwaukee and Michigan Southern. It has stood first rate. That street is just as good as the day it was put down, excepting the natural wear. It is as smooth and level as the day we left it.

Q. So far as you know, there has been no dry-rot in cedar wood laid in pavement in this city?

A. No, sir.

Q. And you don't know that there ever will be?

A. No.

(Signed) R. H. COON.

JOHN F. MCMILLAN sworn for complainant.

Examined by Mr. LOTHROP:

Question. How old are you?

Answer. 41.

Q. How long have you lived in the city?

A. Ever since I was born.

Q. What is your business?

184 A. Contracting.

Q. How long have you been engaged in paving?

A. I have been connected with it more or less for 13 years.

Q. Are you acquainted with the pavement on Hastings street, between Franklin and Atwater, in this city?

A. Yes, sir.

Q. How recently have you examined that pavement?

A. Within 10 days.

Q. What was the condition of that pavement?

A. It was in very fair condition.

Q. Are you acquainted with the pavement on Clifford street in this city?

Q. How recently have you examined that?

A. I have been over that several times within a week.

Q. What is the condition of that?

A. It is in good condition, very good for the time it has been laid.

Q. Are you acquainted with the pavement on St. Aubin avenue?

A. Yes.

Q. How recently have you been over that?

A. Within two weeks.

Q. What is the condition of that pavement?

A. It is not very good; there are many bad spots in it, apparently decayed.

Q. Are you acquainted with the pavement on 12th street, in this city, north of Michigan avenue?

A. I am.

Q. How recently have you been over that?

A. Within a fortnight.

185 Q. What is the condition of that pavement?

A. That is decayed between Michigan avenue and Walnut street. It is decayed very badly—some of the blocks. Some are better than others. The first three or four blocks are badly decayed.

Cross-examination:

Q. The pavement on Hastings street & Clifford street is all cedar?

A. Yes, sir.

Q. On St. Aubin avenue and 12th street it is pine?

A. Yes, sir.

Q. On St. Aubin and 12th street pine is laid on sand?

A. Yes, sir.

Re-direct:

Q. State whether it is practical in laying a pavement, the expense and waste of material being considered, to lay a cedar pavement of rectangular blocks?

(Objected to as irrelevant.)

A. It cannot be laid as cheaply as the round blocks.

Q. Have you had occasion to examine and figure on the difference in cost of a cedar pavement composed of blocks in their natural form and the same pavement composed of cedar blocks of rectangular form?

A. I have.

Q. When was that?

A. Last spring.

Q. Where was that?

A. In Buffalo.

Q. State what the difference in cost of the two pavements was according to your estimates of the work.

186 (Objected to as immaterial.)

A. For the round block my bid on the whole contract was somewhere near $10,000, and on the rectangular cedar blocks it was between $15,000 and $16,000.

Q. State what would have been the cost of that same job with rectangular pine blocks.

A. I could not state exactly. It would have been very nearly as much as the rectangular cedar, perhaps two thousand dollars less.

Re-cross:

Q. What makes the difference between rectangular pine and rectangular cedar?

A. I suppose it is the larger growth of the pine tree, and there being more cull timber in cedar than in pine.

Q. Do you know that there is more cull timber in cedar than in pine?

A. No, I don't know it; but I should think so from the appearance of large cedar logs. All that I have ever seen here had worm-holes through. When they grow so large they are pretty generally wormy or have worm-holes in them.

Q. Does not cedar grow too large to be used in circular form?

A. I think it does, larger than the specifications admit of.

Q. Should not rectangular blocks be produced from either cedar or pine at the same expense?

A. I think not.

Q. Why?

A. On account of the waste in material in cedar.

Q. Why waste?

A. I should judge that the cedar would show more culls than pine would.

187 Q. Why more culls?

A. Because there are so many more rotten spots in it. You take a pine log two feet and a half in diameter, and it is generally pretty sound. It is next to impossible to find a cedar log of that size that is sound.

Q. Do you mean to say that a living tree of cedar is not as sound as a living tree of pine?

A. I say there is more or less rotten flaws in it, what they call pin-holes, that run clear through, which would have to be cut out after a cedar tree grows to that size, than there are in pine. Any defects there are are plainly shown.

Q. You have never seen a large cedar tree sawed up or manufactured into boards or blocks?

A. No, sir.

Re-direct:

Q. As a general rule, is not cedar too small in the log to admit of being worked up into plank, into rectangular blocks, as profitably as pine logs?

A. There is very seldom any of it shipped here large enough to manufacture into plank.

Q. The item of waste in cutting up cedar logs would be very serious as compared with pine?

A. I should think it would be.

(Signed) JOHN F. McMILLAN.

188 NOVEMBER 19th, 1878.

ALANSON SHELEY sworn for complainant.

Examined by Mr. LOTHROP:

Question. How long have you lived in Detroit?

A. 48 years.

Q. Do you remember Atwater street in this city being paved with stone?

A. Yes, sir.

Q. Do you know of any wooden pavement being laid on Atwater street before that stone pavement was laid?

A. Yes, sir.

Q. Where was that pavement?

A. Between Randolph and Brush streets.

Q. Do you know who laid that pavement?

A. Julius Eldred.

Q. Will you state what the shape of the blocks composing that pavement was?

A. The logs were sawed round and four slabs taken off, making 8 corners.

Q. So that the blocks were octagonal?

A. Yes, sir.

Q. Do you know whether that pavement stood there until Atwater street was paved with stone?

A. I could not say as to that.

(Signed) A. SHELEY.

189 ENOS LEEBOT sworn for complainants.

Q. How long have you lived in this city?

A. 54 years.

Q. Do you remember when Atwater street in this city was paved with stone?

A. Yes, sir.

Q. Where did you live at that time?

A. Opposite Mr. Eldud's place, across the way, between Brush and Randolph streets, on Atwater street.

Q. Do you know of any wooden pavement on Atwater street prior to the stone pavement being put there?

A. Yes, sir.

Q. Where was that?

A. In front of Eldud's property; he paved one-half of Atwater street the width of his property.

Q. Was it anywhere near where the foot of Brush street now is?

A. Midway between that and Randolph street.

Q. Was there any wooden pavement other than that on Atwater street up to the time it was paved with stone?

A. Not that I know of.

Q. Did you live on Atwater street up to the time it was paved with stone?

A. Yes, sir.

Q. What shape were the blocks that composed this wooden pavement?

A. They were eight square.

Q. Do you know who laid that pavement?

A. I don't.

Q. Do you remember whether that pavement remained on
190 that street until it was paved with stone?

A. Part of it did.

Cross-examined by Mr. HOLBROOK:

Q. What kind of timber was that?

A. Pine.

Q. Cut right square off?

A. Cut square off about a foot long.

Q. Set on the ground or on gravel?

A. I do not think there was any sand under it, but think there was ashes.

Q. Do you remember that Watson and Brunnel had a limekiln down there?

A. I do.

Q. Was this pavement in front of their property?

A. No.

Q. You say these blocks were cut off eight square?

A. Some were eight by eight pieces, if I recollect; and then the corners were taken off, made sort of eight square.

Q. Nearly round?

A. No; they formed a flat edge, kind of matched, so that they could be got close together.

(Signed) ENOS LEEBOT.

191 JESSE H. FARWELL recalled for complainant.

Q. You are a paving contractor in this city?

A. Yes, sir.

Q. Will you state, if you can, the number of yards of wooden pavement of all kinds laid in the city of Detroit, in the year 1867, and also the following years down to and including 1871?

A. 1867, 42,636; 1868, 39,638; 1869, 21,986; 1870, 20,178; 1871, 284,672.

Q. What was the average amount of pavement of all kinds, wooden pavement, laid in the city during those five years?

A. 81,822 yards.

Q. What was the number of yards of all wooden pavement, except the Phillips pavement, laid in the city of Detroit in the year 1872?

A. 16,375.

Q. How many yards of Phillips pavement, if any, were laid in the city that year?

A. 6,876.

Q. How many yards of all wooden pavement other than the Phillips were laid in the city in 1873?

A. 56,871.

Q. How many yards of Phillips pavement?

A. None in that year.

Q. How many yards of all wooden pavement other than the Phillips were laid in the city in 1874?

A. 17,588.

Q. How many yards of the Phillips pavement were laid in that year?

A. 53,864.

Q. In 1875 how many yards other than Phillips?

192 A. There was none other than Phillips laid in 1875.

Q. How many yards of the Phillips pavement?

A. 138,835.

Q. In 1876?

A. There was nothing but the Phillips in 1876; there were 105,000 yards of that; there was nothing but the Phillips in 1877; 119,277 yards.

Q. What was the average amount of Phillips pavement laid in this city in those six years?

A. 70,321 yards.

Q. From what source did you derive the data from which you make these statements?

A. From the official records and documents.

Q. The records of the city of Detroit?

A. Yes, sir; and the contracts.

Q. Have you examined those on record in this city?

A. Yes, sir.

Q. And the amounts you state are taken from those?

A. Yes, sir.

Q. Did you believe those amounts to be correct as shown by those records?

A. I did.

Q. To whom do those records belong?

A. The city of Detroit.

Q. In whose custody are they?

A. Some of them are with the board of public works and some in the controller's office.

Q. Are there any of those records in the office of the city clerk?

A. They are all in the other offices.

193 Q. Have you examined the relative cost of the Phillips pavement and the rectangular block pavements, as shown by actual bids made for laying the same in the city of Detroit within the last two or three years?

A. There have been no bids for the last two or three years, for the whole matter of other styles of wooden pavements has been abandoned during 1876-'77 and the present year.

Q. Then the last wooden pavement other than the Phillips was laid in 1875?

A. Yes, sir; my impression is that there were no bids in 1875 also.

Q. Can you state, from an examination of actual bids made before

1875, the relative difference between the cost of the Phillips pavement and the other wooden pavements?

A. The cost of the standard wooden pavements other than the Phillips for the years 1872–'3 and 1874 was from 25 to 40 per cent. higher than the Phillips.

Q. Can you give the actual price per yard of any of those different pavements during any of the years you have named?

A. I compared the first of the Phillips that was laid in 1872 with the other wood pavement, and it was about 26 cents per square yard lower than the others.

Q. Did that relative proportion of price continue up to the time the other wooden pavements were discontinued?

A. Yes, sir.

Q. State, if you please, whether towards the end of laying the other wooden pavements the disproportion in price was not greater than 26 cents per square yard.

A. There were some contracts where it was larger than
194 that. They varied from 25 to 40 cents per yard.

Q. State what in your judgment as a contractor, if any, would be the difference in price between the Phillips pavement and any standard rectangular block wooden pavement composed of cedar blocks.

A. I would put it 50 per cent. in favor of the round blocks.

Q. State for what reason the rectangular cedar block would be so much more expensive than the Phillips pavement.

A. There is a very small per cent. of cedar timber that could be worked into plank suitable for rectangular blocks.

(All the foregoing testimony given by Mr. Farwell relative to the amount of pavement laid, etc., is objected to as incompetent, the documents and papers on file in the city offices being the best evidence.)

Q. What had been your experience of the effect of tar or any other water-proof cement upon paving blocks?

A. It has a tendency to promote dry rot.

(Signed) JESSE H. FARWELL.

195 *License to lay and use Phillips' patent pavement.*

This agreement, made this 25th day of September, 1874, between Robert C. Phillips, of Cincinnati, county of Hamilton, and state of Ohio, of the first part, and Jesse H. Farwell and Eugene Robinson, of the city of Detroit, of the county of Wayne, in the state of Michigan, of the second part, witnesseth:

That whereas letters patent of the United States for an improvement in wooden pavements was granted to the party of the first part, dated December 5, 1871, and numbered 121,544; and whereas the party of the second part is desirous of laying and using the wooden pavement containing the patented improvements therein

secured, and to authorize its use by the public after being laid within the state of Michigan—

Now, therefore, the parties have agreed as follows:

1st. The party of the first part hereby grants exclusive licenses and empowers the party of the second part to lay down, subject to the conditions hereinafter named, in any public or private place or building within the said state of Michigan, and in no other place, from Jan'y 1st, 1874, until the 25th day of September, 1884, the said wood pavement containing the patented improvements specified therein, and to authorize the use of the same by the public, or by private parties, whenever so laid down by them.

2nd. The party of the second part agrees to make full and true returns to the party of the first part, under oath, upon the first Monday in the months of January, March, May, July, September, and November of each and every year during the continuance of this license, of all said pavement laid by them, for whom laid, and in what localities.

3rd. The party of the second part agrees to pay to the party
196 of the first part 10 cents as a license fee upon every square yard of such pavements so laid by them.

4th. Upon the failure of the party of the second part to make returns, or to make payement of license fees as herein provided, for ten days after any of the days herein named for such returns and payment, the party of the first part may terminate this license by serving a written notice upon the party of the second part; but the party of the second part shall not be discharged thereby from any liability to the party of the first part for any license fees due at the time of the serving of said notice, or becoming due after the service of said notice; and the party of the second part further agree and bind themselves to use all due diligence to introduce and lay down said pavements in all the principal towns and cities of Michigan, and that a failure to do this shall form good and sufficient grounds for the cancellation of this license by the party of the 1st part. The party of the second part also waives all legal and technical grounds to said cancellation.

5th. The party of the second part further agree and bind themselves to lay said pavement in all cases in a good, substantial, and workmanlike manner and in accordance with the specifications prepared by the party of the first part.

In witness whereof the parties above named have hereunto set their hands this day and year first above written.

(Signed) E. C. PHILLIPS.
EUGENE ROBINSON.
JESSE H. FARWELL.

Detroit, Mich., Sept. 25, 1874.

197 Received for record January 20, 1876, and recorded in liber 20, page 90, of transfers of patents.

In testimony whereof I have caused the seal of the patent office to be hereunto affixed.

(Signed) . ELLIS SPEAR,
Acting Commissioner.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell, & Eugene Robinson
vs.
The City of Detroit. } In Equity.

The foregoing is admitted to be a true copy of the license from complainant Phillips to complainants Robinson & Farwell mentioned in the bill of complaint in this cause by filing the same, with the same effect as if the original thereof was produced and proved.

(Signed) D. C. HOLBROOK,
Of Counsel & Sol'r for Def't.

Detroit, Oct. 30, 1876.

198 JOHN H. LAWRENCE, a witness produced on behalf of the complainant, at Cincinnati, in case of Robert C. Phillips *vs.* City of Cincinnati, being first duly sworn, deposes and says as follows, in answer to questions propounded to him by complainant, R. C. Phillips:

Question 1. Please state your name, residence and occupation.

Answer 1. John H. Lawrence; I am fifty years of age; I reside at 92 Fourteenth street, in the city of Cincinnati; I am a contractor.

Q. 2. How long have you been engaged in the business of contractor and in what line of business have you been contractor?

A. 2. I have only been contractor during the last year; in street paving.

Q. 3. Please state what experience and observation you have had in reference to street paving; and what public position have you filled in this city?

A. 3. In the year 1864 I was elected one of the city commissioners and re-elected again in April, 1867, which office I held until July, 1869; I was then appointed as one of the assistant street commissioners, which office I held until May, 1872; the duties of my office as street commissioner and assistant commissioner was to carefully examine and supervise the laying of pavements, and the repairing of pavements, and general supervision of the streets.

Q. 4. Have you examined the letters patent No. 121,544, and dated December 5th, 1871, granted to Robert C. Phillips, by the United States patent office; and are you familiar with the specifications contained in said letters patent?

A. 4. I have examined the patent, and am familiar with the specifications contained in said letters patent.

199 Q. 5. Have you seen a pavement laid such as is described in said letters patent; and if so, when and where did you first see such pavement laid?

A. 5. I have; on Sixth street, below Harriett, in this city. This was in the summer of 1869, either in June or July.

Q. 6. Have you seen the same kind of pavement laid at any other points; if so, please state when you saw it laid and some of the places where it was laid?

A. 6. I have; at the intersection of Fourth & Vine streets, in the year 1870; at the intersection of Sixth & Cass streets, in February, 1870, as nearly as I can recollect the date; on Fourth street, between Walnut and Race streets, between the tracks of the street railroad, in 1870; on Ninth street, between Central avenue and Plum streets, in the spring of 1871; at the intersection of Seventh and Elm streets, and at several other places in the city of Cincinnati. The pavements laid at the times and places stated in this answer were laid under my supervision, and in the district over which I had charge as street commissioner or assistant commissioner. I also saw the same kind of pavement laid on East Pearl street, alongside of the rails of the street railroad, from Butler street eastwardly, about fifteen hundred feet, about July, 1869; on South Court street I saw the same pavement laid, late in the fall of 1869. I saw the same kind of pavement laid on Vine street between Seventh street and Hamilton road to Mohawk bridge, in the fall of 1870. It was also laid under my supervision, between the street railroad tracks, in the spring of 1872, on Central avenue between Liberty street and within about fifty feet of 12th street.

200 Q. 7. Have you given any attention to this pavement since it has been in use in this city?

A. 7. I have.

Q. 8. Please state how much attention you have given to the subject.

A. 8. I have supervised the laying of it, watched it carefully since it has been laid, and I have driven over it and seen others driving over it, and where it has been properly put down I find it the best wooden pavement that I have seen laid.

Q. 9. In a pavement laid in accordance with the specifications contained in said letters patent, No. 121,544, is there any practical difficulty in rendering the said pavement practically impervious to water passing through it from the surface.

A. 9. No.

Q. 10. Please state whether or not this pavement has been placed, as a rule, in places where the wear and tear was very great, and whether or not it has frequently been put in situations where boulder and Nicholson pavements have failed?

A. It has; and it has been placed on intersections, also in railroad tracks where nothing else would stand, where neither the Nicholson nor the boulder pavement would stand, I mean.

Q. 11. Please state your estimate of the general advantage and

the value of the rough, round block pavement of which you have been speaking, as compared with other wooden pavements with which you are familiar, taking into account in your estimate the relative cost and durability of this pavement, as compared with other wood pavements with which you are familiar.

A. 11. It is much cheaper, simpler in construction, and more durable than other wood pavement with which I am familiar.

Q. 12. Please name the other wood pavements with which you are familiar.

201 A. 12. The Nicholson, the Prescott, the rectangular block pavement.

Q. 13. Please state what has been your observation and experience as to the advantage or disadvantage resulting from the use or omission of tar, asphalt, and similar substances, in, under, or about wood pavements, in their construction.

A. 13. It is a great disadvantage to it; the acids in these substances really help to eat up the blocks.

Q. 14. Please give us the result of your experience and observation as to the advantage or disadvantage in the use of board bottoms in the construction of wood pavements.

A. 14. Board bottoms are a great detriment in the construction of any wood pavement, it being an impossibility to keep the board solid upon the bed, the board continually springing and leaving a vacuum for water. In making repairs of a wooden pavement it is a considerable expense, and very difficult to relay the bottom boards.

Q. 15. It is in evidence that in some cases at least the corners of edges of some of the round blocks have worn off, and the top, as a consequence, become rounded, and the pavement rough, similar to a boulder pavement; if you have observed such a result in any case please explain the cause?

A. 15. I have observed it in some cases; knotty projections on blocks, making a large space between; gives the narrow tired vehicles a chance to wear off the edges very fast. Some blocks having sap upon the edges is another cause; the sappy edges being softer, but it does not practically hurt the pavement.

Q. 16. If the blocks are properly prepared and trimmed, and the blocks set closely, so that the spaces between the blocks are
202 as small as possible, and the pavement has not too much crown, will or will not this rounded condition of the blocks result?

A. 16. Very little. With our tremendous travel upon our streets, it is an impossibility to put anything or any kind of pavement but what will wear some.

(Counsel for defendant now comes in and objects to question and answer No. 6, and No. 11, and No. 14, as introducing new matter in rebuttal, and as irrelevant and incompetent.)

(Signed) W. F. BOYD,
Notary Public.

Cross-examination by HIRAM D. PECK, esq., of counsel for defendant:

Q. 1. In 1870 or 1871 you gave complainant an affidavit setting forth your opinion of the round block pavement, for the purpose of enabling the complainant to obtain a patent, did you not?

(Question objected to by complainant as being irrelevant and improper.)

(Signed) W. F. BOYD,
Notary Public.

A. 1. I do not remember the date, but I gave Mr. Phillips an affidavit for that purpose and judge it was about that time.

Q. 2. Did you talk with the complainant with reference to the pavement at and previous to the time you gave him such affidavit; and did he explain to you his views of the advantages to be derived from its use?

(Question objected to by complainant as irrelevant.)

(Signed) W. F. BOYD,
Notary Public.

A. 2. I do not remember any particular conversation that we had. I had heard him talk over the round block pavement; I heard him explain the advantages of the pavement, but whether at that
203 time or previous, I could not say.

Q. 3. As you were both city officers at the same time, you probably had a good many conversations with the complainant about the pavement, did you not?

A. 3. I do not know of any particular conversation that we had, as I stated. In the summer of 1869, I think, Mr. Phillips proposed that we should put down this pavement on Sixth street. We went there together and he gave me his ideas of it. We put it down according to his ideas of it on the patent, now; but any particular conversation with regard to it I do not remember; I presume we had talks about it.

Q. 4. When you speak of the durability of the round block pavement, is it not true that whatever of durability it may have, is due to the fact that it has been made of locust or other hard wood in all cases where it has been put down in this city?

A. 4. I think not; the wood is one reason of its durability; another is the manner and method of its laying.

Q. 5. Is not a pavement composed of square oak blocks or any other form of oak blocks than round more durable than the round block pavement described in complainant's patent?

A. 5. I think not.

Q. 6. Would not a pavement made of blocks of hard wood, with the sap sawed, split or hewed off, and laid upon gravel and filled with gravel, be superior to the pavement described in complainant's letters patent?

A. 6. I think not, for this reason: there is such a small amount of sap upon the blocks that it does not effect anything.

Q. 7. You regard the sap on the round block then as no
204 objection, do you?

A. 7. I do not think it is any objection.

Q. 8. How do you know, as stated in your answer to direct question 13, that the acids in tar and asphalt help to eat up the blocks?

A 8. I know it by experiments that I made in 1866, 1867 and 1868 with tarred blocks put alongside of untarred blocks.

Q. 9. Is it or is it not true that the centre of the tarred block decays first?

A 9. It is; I found it so; the reason of that is this: the thin coating of tar that gets on these blocks only penetrates at farthest not more than an inch into the block, shutting up the pores and allowing the centre to decay.

Q. 10. Do you mean to say that a pavement made as specified in complainant's letters patent can be made water-tight at the time it is put down?

A. 10. No, sir; nor never. I never saw pavement yet that was entirely water-tight.

Q. 11. Does not the round block pavement, when constructed according to the specifications in complainant's patent, permit water to pass through in considerable quantities, especially when new?

A. 11. Not at all—not more than any other pavement; this pavement properly put down, well rammed, would allow but very little water to go through. Any new pavement some water will naturally go through it until all the interstices are filled.

Q. 12. Is it not impossible, by reason of the irregular spaces between the blocks of a pavement constructed according to the specifications in complainant's patent, to ram the gravel or sand filling between such blocks as may be done in case of wooden pave-
205 ments constructed of blocks of regular form?

A. 12. No; it is not impossible to do it.

Q. 13. Could it be done with any reasonable amount of expenditure?

A. 13. It can; we done it in laying the pavement on Sixth street and on Fourth street.

Q. 14. Why was not that practice continued?

A. 14. I do not know.

(Signed) JOHN H. LAWRENCE.

In the Circuit Court of the United States for the eastern district of Michigan. In equity.

Robert C. Phillips et al.
vs.
The City of Detroit.

The above deposition may be read in this case the same as if regularly taken therein in behalf of complainant.

(Signed) F. A. BAKER,
Sol'r for Def't.
D. C. HOLBROOK,
Counsel for Def't.

206 In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Eugene Robinson, and Jesse H. Farwell
vs.
The City of Detroit.
In equity.

Testimony taken on the part of the complainants, March 18th, 1879, before George H. Carlisle, as special examiner, under stipulation of March 1st, 1879; George H. Lothrop, appearing for the complainants, and D. C. Holbrook, esq., appearing as counsel for the defendants.

ALEXANDER L. PATRICK recalled.

Examined by Mr. LOTHROP:

Q. Mr. Patrick, state if you are acquainted with what is known as the Flanigan pavement laid on Grand River avenue, in the city of Detroit.

A. I am, sir.

Q. State, if you please, how that pavement is laid.

A. There is a foundation of concrete ballast and on it was laid five inch round cedar blocks, filled in with gravel, and on that was put a solution of pitch and tar, and one inch of sand was laid on top.

Q. State how the concrete which you have referred to was made.

A. It is a composition of asphalt, pitch, tar, sand and gravel.

Q. State what its character is as to being water tight when laid.

A. It is impervious to water.

207 Q. Have you examined the condition of that Flanigan pavement on Grand River avenue recently?

A. I have, sir.

Q. State in what condition you found the cedar blocks in that pavement.

A. I found them in a very dilapidated condition.

Q. Describe their condition as near as you can.

A. The street is all irregular, being full of holes caused by the blocks being rotten where the depressions are.

Q. State whether you have taken up specimens of these blocks, and if you have, please produce them.

A. Here is a specimen that I took up fifty feet south of the intersection of Twelfth street. It being a difficult thing to get them up without breaking them all to pieces, I got one of them picked up and then it fell to pieces afterwards, so you will see the condition of most of it; there is the first stages of decay or decomposition, and in a part of the wood where there is not any reason that there should be any rot except it be from the action of the elements on it.

(Blocks exhibited by witness are put into a bag, to which is attached a card marked "Phillips Exhibit R, G. H. C.")

Q. What, in your opinion, is the cause of the decay of these blocks in the Flanigan pavement?

A. I think it is on account of the foundation.

Q. State if you know the character of the blocks as to soundness of which this pavement was originally composed.

A. It was composed of good timber; better I can assure you than was laid on the upper part of Woodward avenue.

(Signed) ALEX'R L. PATRICK.

208 EUGENE ROBINSON recalled.

Q. You have been a paver here for a good many years?

A. Yes, sir; I have.

Q. Do you know when this Flanigan pavement, testified to by Mr. Patrick, was laid?

A. In 1871; I was city engineer at that time.

(Signed) EUGENE ROBINSON.

JESSE H. FARWELL recalled.

Q. Mr. Farwell, do you know when this pavement on Grand River avenue, testified to by Mr. Patrick, was laid?

A. In 1871.

Q. Do you know what was the character of the material put into that pavement?

A. I took particular notice of it, and it was the very choicest sort of timber.

(Signed) JESSE H. FARWELL.

EUGENE ROBINSON recalled.

Mr. LOTHROP:

Q. Do you know as to the soundness of the timber with which that Flanigan pavement was laid?

A. It was as good as was generally used; it was in good condition; good, sound cedar.

CHARLES M. DAILEY, being duly sworn on the part of the complainants, and examined by Mr. LOTHROP, testified as follows:

Q. What is your business?

A. I am superintendent of the Grand River street railway; that is my principal business.

Q. Are you acquainted with the Flanigan cedar block pavement on Grand River street, in the city of Detroit?

209 A. I have been acquainted with it from the time it was laid down.

Q. State whether you have had any cause to relay any of that pavement; and, if so, when?

A. I do not recollect ever taking up any of the pavement until last fall; then I took and repaired it in two or three places, and replaced with somewhere from three to five cords of blocks. I had about ten cords, and used about one-half of them up there.

Q. How were the original blocks which you took up and replaced?

A. They were rotted, partially.

Q. State what kind of blocks were originally laid, if you please?

A. They were cedar blocks: round cedar blocks.

Q. Mr. Dailey, what is the general condition of that pavement?

A. Well, it is bad; worse than I wish it was, for my sake. There is a great deal of it will have be replaced this summer.

Q. Is it from being worn out, or from decay?

A. It is decay; there are places of round blocks which are in good condition; there are places on the track where it is sound and good, but most of it is decayed; I have not had occasion to examine it this summer, but where I have taken it up I have found a good many rotten places.

(Signed) CHARLES M. DAILEY.

210 *Stipulation as to the Testimony of D. Farrand Henry.*

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell and Eugene Robinson
vs.
The City of Detroit. } In equity.

It is hereby stipulated by and between the parties, that the testimony of D. Farrand Henry may be taken in this case, before George H. Carlisle, of Detroit, with the same force and effect as if said Geo. H. Carlisle had been appointed by the court especial examiner in this cause to take said testimony.

(Signed) D. C. HOLBROOK,
Of Counsel for Def't.
GEO. H. LOTHROP,
Sol'r for Compl'ts.
F. A. BAKER,
City Counselor.

Dated Detroit, March 1, 1879.

211 *Testimony of D. Farrand Henry.*—Filed May 20, 1879.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell & Eugene Robinson
vs.
The City of Detroit.
} In equity.

Testimony taken on the part of the complainants by stipulation, before Geo. H. Carlisle as special examiner, on Saturday, the first day of March, A. D. 1879; George H. Lothrop appearing for the complainants, and D. C. Holbrook, esq., for the defendant.

D. FARRAND HENRY, a witness produced, sworn and examined in behalf of the complainants, testified as follows:

1. What is your name, age, residence and occupation?

A. D. Farrand Henry; resident of the city of Detroit; civil engineer by profession; forty-five years of age.

2. How long have you been a civil engineer, and during that time in what specific pursuits have you been engaged?

A. I graduated in the Yale Scientific School in 1852; after that was employed for a short time on railroad and city surveys; then I was appointed government engineer and was connected for many years with the lake survey, the United States lake survey; was then a short time in the mercantile business; and after that was engaged to superintend the construction of the water works in the city of Detroit.

3. You mean the new water works?

212 A. Yes, sir; the new water works.

4. Will you please state whether you have examined letters patent of the United States No. 121,544, dated December 5th, 1871, granted to Robert C. Phillips; and if so, whether you understand the same, and what you find to be the invention covered by these letters patent?

A. I have examined letters patent for improvements in wooden pavements 121,544, granted to Robert C. Phillips, and I think I understand the things that are claimed in that patent; they are as follows: It states blocks of wood cut from trunks of trees and left in their natural state, with the exception of being divested of their bark; they are placed with the fiber vertically upon the foundation of sand that has been made solid by rolling or pounding, and the spaces between the blocks afterwards filled in with sand or gravel and properly packed; the blocks are placed indiscriminately as regards size close together; I understand this claim consists of three elements, viz: First, blocks of wood in their natural form with only the bark removed; second, a foundation of packed sand or gravel; and third, the filling of the spaces between the blocks with sand or gravel.

4th. State whether you have examined English letters patents, certified copies of English letters patent No. 5,185, granted to John Lindsey in the year 1825, marked "Defendant's Exhibit One;" and if so, state how, in your opinion, the improvements described in this letter agree with or differ from the letters patent granted to Mr. Phillips just described by you, and state your reasons for any opinion you may give?

A. I have examined the patent 5,185, issued to John Lindsey in 1825, and find that it claims the construction of a pavement
213 consisting of blocks of stone, in the form of truncated pyramids, placed with their broadest ends downward and close together; the wedge space left being filled with stone wedges driven into the interstices and afterwards filled with fine pulverized stone or gravel—the whole making a pavement nearly as substantial as granite. No particular foundation is specified. This exhibit contains none of the three elements in patent 121,544, for the blocks are of stone and are manufactured to a certain shape, placed side by side and the spaces filled as closely as possible with stone wedges, and a filling of pulverized stone or fine gravel being filled into the interstices left between the wedges and blocks.

5th. Have you examined English letters patent No. 5827, granted to John J. A. McCarthy in the year 1825, "Complainant's Exhibit N," and understand the contents thereof, and if so please state how these letters patent agree with or differ from the complainant's patent, and give your reasons for any opinion you may express?

A. I have carefully examined English patent No. 5287, to J. J. A. McCarthy in 1825, and I find that it claims a pavement made of blocks of stone or other material, which blocks are formed with projecting teeth to match into corresponding depressions in the remainder. No foundation is specified. Cement covering and sand may be placed between the blocks, but preferably not. This exhibit specifies, therefore, blocks of stone or other material manufactured to a particular shape and driven together as they are laid, and locked by means of projecting teeth. When desired sand filling can be used between the blocks, but the inventor says "preferably not," as it seems to serve no useful purpose. Therefore this exhibit
214 does not contain any of the three elements of the combination set forth in patent 121,544.

6th. State whether you have examined and understand certified copy of English letters patent No. 7645, granted to David Sted in 1838, "Defendant's Exhibit B," and if so, how that patent agrees with or differs from the complainants' patent, and give your reasons for any opinion you may express?

A. I have carefully examined English letters patent No. 7645, issued to David Sted in 1838, and understand this patent to claim a pavement composed of blocks of wood oxygonal in shape, or triangular, or square, placed close together, with dowels or pins fitting into proper recesses in the blocks, and securing them and pinning them together. These blocks are set with the grain vertically upon

the earth, properly leveled with sand or other fine filling; the pins being inserted and driven close together, the interstices being afterwards filled with melted pitch, or pitch and sand or earth mixed. This exhibit, therefore, shows manufactured blocks placed closely, and bound firmly together with dowels or pins. If by the sand filling is meant a bed of sand over the level earth, then there is a sand foundation. The interstices inevitably left between the blocks are filled with pitch or pitch concrete. I find that this exhibit contains only one of the elements of patent 121,544, that is the sand foundation; but not the combination there set forth.

7th. State whether you have examined and understand certified copies of English letters patent No. 8041, granted to David Sted in 1839, "Defendant's Exhibit A," and if so, state how the improvements described in said letters patent agree with or differ from
215 the patent of the complainant, and give your reasons for any opinion you may express?

A. I have examined English letters patent 8041, issued to David Sted in 1839, and I understand this patent claims a method of constructing pavements with wood blocks of various shapes wedged closely together, with their fibers vertically upon the foundation, whether the roadway be straight or inclined. The blocks used are of almost every shape, according to the key given, and are formed so as to interlock, or by wedges, properly shaped, being driven at the center of the road or at the change of inclination, or by being placed in two courses; the exceptions are circular blocks for the spaces cut to the required shape and size, or by using cement or asphalt and hexagonal blocks placed angle to angle and leaving triangular spaces, which may be filled or partially left open. These last are also cut on a particular surface to form longitudinal or transverse channels, which may be or may not be filled with cement. No foundation is specified. This exhibit claims manufactured blocks of various shapes, generally wedged closely together; or where spaces are left they are either left open or are filled with cement or asphalt. It therefore does not cover any of the elements combined in the claim in patent 121,544.

8th. State whether you have examined and understand certified copy of English letters patent 8,026, granted to Thomas Parkin in 1839, "Defendant's Exhibit J;" and if so, state how the improvements therein described agree with or differ from the complainant's patent, and give your reasons for your opinion.

A. I have examined English patent No. 8,026, issued to Thomas Parkin in '39, and understand that this exhibit covers many things not bearing on this case: The construction of a pavement
216 with blocks keyed together by pins and grooves; blocks of any convenient figure cemented together by filling the spaces with a mixture of sand or other earthy matter and pitch or other bituminous substance; blocks of any figure upon a foundation of sand or sawdust saturated with pitch or other bituminous substances; also, the cutting of furrows or grooves across the upper surface of

the blocks when laid, or in small blocks, chamfering the upper edges, which chamfers or grooves may be left open, or a filling of asphalt or other cement, or with sand or gravel. Figure 30 in the drawing shows a batch of circular blocks cemented together in a square space with a mixture of pitch, &c., with a mixture of sand or other earthy material above mentioned. Most of the methods described name manufactured blocks, but two of them name blocks of any figure which may include blocks in their natural state, specified in 121,544. The foundation is mentioned but once, when it is described as sand, &c., mixed with pitch, &c. This addition of sand to the foundation would undoubtedly cause speedy decay of the blocks in preventing the passing off of the surface water. When the filling is mentioned, except in the last case, it is a concrete used to cement the blocks together. In the last case the grooves cut in the surface of the blocks or chamfers cut out of their upper edges are filled with asphalt or other cement, or with gravel and sand. These chamfers are for the purpose of giving a foothold to horses to prevent slipping, and it must be proportionally shallow. Where chamfers are necessary to make such depressions the blocks must be of such shape as to fit very closely together, and different from the spaces left by
217 rough round blocks. In my opinion this exhibit specifies only one of the elements specified in the patent 121,544, and that is the shape of the blocks under the claim of blocks of any figure, but does not anticipate the foundation nor the sand filling, and does not specify the combination mentioned in that patent.

9th. State whether you have examined and understand certified copy of English letters patent No. 8657, granted to Thomas Wood, the younger, in 1840, "Defendant's Exhibit K;" and if so, how the improvements therein described agree with or differ from the complainanant's patent, and give your reasons for your opinion.

A. I have examined English patent No. 8657, issued to Thomas Wood, the younger, in 1840, and I understand that this patent claims a pavement from blocks of wood or stone or other material, formed in the shape of truncated pyramids and double wedges so made that the alternating blocks in the series are pyramids, standing on their large ends, and in the next on their small ends; the remaining blocks being the double wedges. The inverted pyramids may also be left projecting above the others, when laid so as to be subsequently driven down, and thus firmly bind the roadway together. The foundation named is of mere sand or gravel. The inverted pyramids may also be left projecting above the others, and between these and the top of the others is covered a coat of concrete cement or other bituminous substances, mixed with gravel, sand, &c. The blocks covered by this patent are therefore manufactured. The foundation is not specified, and no filling is mentioned. It contains none of the three elements claimed in the combination in patent No. 121,544.

218 10th. State whether you have examined and understand certified copy of English letters patent No. 8940, granted to

Osborne Reynolds in 1841, "Defendant's Exhibit D;" and if so, state how the improvements therein described agree with or differ from the complainant's patent, and give your reasons for your opinion.

A. I have examined English letters patent No. 8940, issued to Osborne Reynolds in 1841, and I understand this patent to specify the formation of a roadway by beams or planks of wood placed longitudinally, and supported by transverse beams which rest upon the ground. Also forming the surface of the roadway of broken stone, cement, or concrete or asphalt, or of the fibers of the material pressed with cement, which may be placed on top of the foundation or upon any other foundation. This patent also consists of trunks of trees from three to ten inches in diameter, placed with the fibers vertical side by side in their natural state; but as the foundation is not specified, and as the spaces are filled with a fibrous material, cement, or concrete, or asphalt, neither of the other elements are shown, and the combination therein specified is not anticipated.

11th. In this patent would not the fact of the filling of the spaces between the blocks in their natural state with woody fibers have the effect of making a solid wooden pavement in which the blocks would be in close contact, so that decay would inevitably result in a short time?

A. With the woody fibers imbedded in a cement of concrete or asphalt, undoubtedly decay would set in in the blocks, as a free of water would not be permitted to pass between the blocks, as in sand filling it does pass off freely.

219 12th. Have you examined certified copy of English letters patent 9737, granted to Henry Austin in 1843, Defendant's Exhibit C; and if so, state how the improvements therein described agree with or differ from the complainant's patent, and give your reasons for your opinions.

A. I have carefully examined English letters patent 9737, issued to Henry Austin in 1843, and I understand this patent to consist of blocks of wood, or other materials, glued or pinned to planks of wood or other material, which latter are in turn fastened to pieces of timber imbedded in the earth, and thus forming a roadway. Spaces are left between the blocks, which are afterwards filled with a concrete composed of broken stone, concrete, gravel, sand, or any hard or fibrous substance, cemented with liquid lime, melted pitch, lac, caoutchouc, and other liquid adhesive material. In this patent I find only one element claimed in patent 121,544, and that is blocks of wood in any shape, which may include blocks of wood in their natural shape, but the foundation is of earth and the filling a concrete, and therefore it does not cover the combination specified in the patent.

12th. State whether you have examined and understand certified copy of English letters patent No. 10,187, granted to Peter Armand le Comte de Fountainemoreau, "Defendant's Exhibit E;" and if so, how the improvements therein described agree with or differ from

the complainant's patent, and give your reasons for any opinion you may express.

A. I have examined English patent 10,187, issued to Peter Armand le Comte de Fountainemoreau in 1844, and I understand this exhibit to claim a pavement made of wooden blocks or other
220 material, fastened together by means of rods, keys, pins, or bolts, and keyed by wedges of different forms; the blocks have grooves cut in them to receive the rods, &c. The blocks in said methods specified are of almost every form, and are of wood alone, or wood and stone alternating, and asphalt and bitumen combined or alternating. In two of the methods described circular blocks are used, or logs of wood, but these are all bound and keyed together in the same manner, and the drawing represents the circular blocks. Fig. 17, sheet 2, shows a part of the blocks cut away to form the keys, or the wedges to bind the pavement together. The ground is to be rendered smooth and even, and covered with a layer of sand. Where there are any spaces left between the blocks they are filled with an elastic compound, which will expand and shrink as carriages pass over the roadway, so that the spaces shall be always full and no spaces left for water to ——— between the blocks. Also in the surface of the blocks grooves are cut or holes are bored, into which bitumen is poured. Also three-quarters of an inch is cut away from the surface of the blocks, which depressions are filled with bitumen. This patent covers only blocks manufactured and placed upon a foundation of sand, the spaces being filled with bituminous concrete; and thus it contains only one of the elements claimed in the patent 121,544, viz., the sand foundation, and does not anticipate the combination specified therein.

13th. Please state whether the construction of the pavements shown in that patent does or does not necessitate the manufacture of blocks, no matter what may be their shape, to the same size and the inserting of the longitudinal keys.

A. All of his drawings show that the blocks are shaped
221 and manufactured to a certain definite size, and the grooves or places are left for the pins to be inserted, and in that way they are bound together. If they were of various sizes they could not be bound together in such a way.

14th. If the rough blocks or blocks of different sizes described in complainant's patent were used, could the keys described in the patent be used with these blocks?

A. I do not think it would be possible. That figure 17, sheet 2, shows that where they use circular blocks a portion of them are cut away to form keys.

15th. State whether you have examined and understand letters patent of the United States No. 96,062, issued to Gardner Warren in 1869, "Defendant's Exhibit H," and how the improvements therein described agree with or differ from the complainant's patent.

A. I have carefully examined United States patent No. 96,062,

issued to Gardner Warren in 1869. I understand this patent is for an improvement in laying pavement, and claims a foundation of sand and gravel, the former greatly in excess, water being sprinkled over it from a height, and the whole well puddled. It also claims that if the pavement laid on this is of wood the covering of it with a layer of sand and water, and thus filling in the spaces. This exhibit, therefore, covers two of the elements claimed in patent 121,544, that is, the sand foundation and the filling of the spaces. The kind of blocks used are not specified, and thus the combination of wood in the natural state, the sand foundation, the sand filling and foundation claimed in the last is not covered.

16th. State whether you have examined United States let-
222 ters patent 101,590, granted to Tallmadge E. Brown in 1870, "Defendent's Exhibit M," and if so, how the improvements therein described agree with or differ from the complainant's patent, and give your reasons for your opinion.

A. I have examined United States letters patent 101,590, granted to Talmadge E. Brown in 1870, "Defendent's Exhibit M," and I understand this patent to be for an improvement in wooden pavements, and it specifies wooden blocks, rectangular in form, and laid so as to touch at the bottom and form wedge-shaped space at the top. No particular foundation is specified. The crevices are afterwards filled with earth, gravel, &c. Here the blocks are manufactured, the foundation not specified, and the only thing similar to the elements claimed in patent 121,544 is the earth and gravel filling. It does not cover the two other elements, nor the combination therein claimed.

17th. State whether you have examined and understand letters patent of the United States No. 74,862, granted to Henry M. Stowe in 1868, Defendent's Exhibit G, and if so, how the improvements therein described agree with or differ from the complainant's patent, and give your reasons for your opinion.

A. I have examined United States patent 74,862, issued to Henry M. Stowe in 1868, and I understand this patent to claim a pavement composed of wooden blocks wedge-shaped at the bottom and driven into a foundation of sand or loose earth, saturated with water, the blocks being set closely together across the roadway and spaces left between the several rows, which spaces are filled with gravel, or partly filled with sand and gravel and pitch. The whole pavement should be covered with hot coal tar, and then with a layer of sand.

This exhibit claims manufactured blocks placed upon a founda-
223 tion of sand and having the foundation filled with a combination of sand and gravel concreted by having hot pitch poured over it after it is in place. There should also be in the claim, being of course imperative, that there should be a layer of sand afterwards covered over the whole. This claim only covers one of the elements of the patent 121,544, and that is the sand foundation, and does not cover the blocks in their natural state,

nor the sand filling, and does not cover the combination claimed in that patent.

18th. State whether you have examined and understand United States letters patent No. 101,100, granted to D. C. Colby in 1870, "Defendant's Exhibit L," and if so, state how the improvements therein described agree with or differ from the patent of the complainant, and give your reasons for your opinion.

A. I have examined the United States patent 101,100, issued to D. C. Colby in 1870. I understand this patent to consist of an improvement in wooden pavements, and it specifies wooden blocks placed close together in rows across the road, and the laying of planks supported by cross planks and having two angular strips placed near the bottom of the planks, between the rows, and so arranged that when the spaces are filled with the small sand and gravel or broken stone, and stamped in, the strips will slide one on the other and bind the bottoms of the blocks firmly together, and also prevent the filling from getting between the blocks and the planks. It also specifies that broken stone, gravel, or substratum may be used instead of planks. The claim in this patent is for the strips, which does not cover any of the elements of patent No. 121,544, as the blocks are manufactured.

224 19th. State whether you have examined and understand letters patent of the United States No. 85,814, granted to Charles Guidet in 1869, "Defendant's Exhibit F," and if so, how the improvements therein described agree with or differ from the complainant's patent, and give your reasons for your opinion.

A. I have examined complainant's patent, and the United States patent No. 85,814, issued to Charles Guidet in 1869, and I understand this patent to specify a pavement composed of stone parallelopids, with their narrow edges bound and joined and the broad edges champered off. These blocks of stone are laid upon any foundation with their narrow edges close together, the champers leaving grooves and spaces left between the blocks, or broad sides, which spaces and the grooves are afterwards filled with sand. In this patent I find only one element of the combination claimed in patent No. 121,544, and that is the sand filling; but it does not cover the other elements of the combination.

20th. Please state what you mean in your testimony by the term "manufactured blocks."

A. Blocks which are cut with machinery to any desired shape; that is, where they are all of the same shape, or are of any shape laid down for the manufacture by those who need the blocks; as contradistinguished from blocks which are used in the shape in which nature cleft them.

21st. State what functions you find are performed by the third element of the complainant's claim, that is, the simple sand filling, and whether there is any sand filling described in any of the English patents referred to in your testimony, which performs that function or either of these functions.

225 A. The sand filling in my opinion placed between the blocks allows a free circulation of water to and from the blocks, and thus leave them as solid as it is possible for blocks to be in the ground, and prevents both dry rot and decay in a great measure. The pitch concrete or other non-porous material which has been generally placed between the blocks has the tendency to dry rot the blocks by the prevention of the passing off of the water from them. When wood is surrounded by any impervious material it becomes subject to dry rot.

22nd. What other function is performed by the simple sand filling in the Phillips pavement?

A. The sand filling also serves as a lock for the blocks, holding them together in place of the locks which were heretofore supposed necessary to hold them together; I do not think that in any of the English patents the sand is used either as a lock or for the purpose of making free porous matter.

23rd. How are the blocks, if the sand is not used in the English patent as a lock, how are the blocks in these patents fastened together?

A. They are fastened together by keys, wedges, cement, or concrete, and by many other methods.

Cross-examination by Mr. HOLBROOK:

1st. In figure 16, patent issued to Sted in 1839, is there any showing of any keys or anything except the surface of the blocks and the filling; I mean just the drawing itself?

A. No, sir; I don't think in that view there is any shown; nothing but the surface of the blocks and the filling.

2nd. Does not that, the face of that figure, represent it to
226 be gravel or sand or some broken material?

A. The dots are sometimes given in the drawing to represent sand or gravel, but there may be of course sand mixed with pitch or something to hold it together.

3rd. I merely ask if that does not represent it to be merely sand or gravel?

A. I do not know; I hardly know; that is a very indefinite thing in the signs for different articles in drawings; it is so indefinite that I do not like to say.

4th. It might be, or it might be for something else?

A. Yes, sir.

5th. Figure 17, representing a vertical section of 16, does that show blocks of the same size?

A. They may or may not be according to that.

6th. I mean just as it is there?

A. The question is where that section comes; that would be the real question of that.

7th. I merely put the question whether that drawing does not show a vertical view of that figure 16?

A. Yes, sir; a vertical view of some part of it.

8th. Now, is not that drawing the same in force and effect as the Phillips patent if the spaces are filled with sand?

A. No, sir; these blocks are all of the same size and shape in that drawing.

9th. These you take to be manufactured blocks?

A. Yes, sir; they look like it in the drawing.

10th. May not cedar block selected from a number be the same size and shape?

A. It would be almost impossible to get any quantity of cedar blocks the same size and shape.

227 11th. Would not cedar be more likely to be, if selected as to the size, of one size than any other wood?

A. No, sir; there are a good many other woods. The balsam and the fir; these trees are more likely to grow nearer the same size and more likely to be circular. The cedar is not a circular tree, generally speaking; I mean it is more likely to be rough than a good many other trees.

12th. You speak of the balsam?

A. Yes, sir.

13th. Could not a selection of blocks be made from the balsam to be of almost the same size?

A. It is possible.

14th. So near as not to make a difference?

A. Probably you could select from a lot of balsam timber a lot of blocks that would be practically the same size.

15th. And they would be larger or smaller, as you please?

A. Yes, sir.

16th. Are not the blocks of the balsam or cedar on the side nearly smooth?

A. Cedar has a tendency to be rough on the sides; it rarely grows perfectly straight.

17th. How as to balsam?

A. Balsam is a straight grain circular wood.

18th. Is the surface smooth, or not?

A. Yes, sir.

19th. I understood you to say that you do not find in any of these patents any of the spaces or interspaces filled with sand or gravel merely?

228 A. I said that in none of the English patents was the sand used apparently for the purpose of locking together the blocks or for the free percolation of the water to and from them in the way that it was described in the Phillips patent.

20th. I ask you if you do not find the filling of some of these English patents to be merely sand and gravel?

A. I do not remember of any specification which shows sand filling alone, or gravel filling alone, without some means of fastening the blocks together besides it.

21st. In the Warren patent, does that not authorize the use of blocks of wood of any form?

A. That patent, as I understand it, is merely for the foundation, and any pavement can be laid upon that foundation.

22d. What is that foundation?

A. That is sand and gravel, largely in excess of gravel, and sprinkled with water, and puddled.

23d. Then the blocks of wood are placed upon that sand?

A. Yes, sir.

24th. Cannot these blocks of wood be of any form?

A. Any pavement can of course be placed upon that foundation.

25th. Would not this patent cover natural and artificial blocks?

A. No, sir; I do not think it would.

26th. Why?

A. It does not cover blocks at all—the patent does not.

27th. You mean to say that this patent is not for blocks at all, but for a mere foundation?

A. Yes, sir; it merely covers a foundation.

28th. I ask you if upon that foundation blocks of any
229 form may not be used?

A. Yes, sir; you can place anything upon that foundation I suppose after you have that patent.

29th. If under this patent, using this foundation, and this filling as described in the claim, and using blocks of wood in their natural state, would not that pavement come within this Phillips patent?

A. If it was possible to make that combination without infringing upon the rights of other people.

30th. The question is whether it would not be the same pavement?

A. Of course the foundation and the filling are the same as is claimed in the Phillips patent; there is no doubt of that.

31st. I ask you if blocks in their natural state with their bark off, whether that would not fully comply with the Phillips patent?

A. It is not the combination in the Phillips patent at all; there are three things claimed in the combination.

32nd. I ask you if blocks of wood in their natural state resting vertically upon this foundation would not be the same as the Phillips patent?

A. It might represent the Phillips patent, but I don't think it would really be what is claimed in this patent at all.

33rd. I don't say what is claimed, I merely ask you the fact?

A. It is very difficult to say, because when there is a combination that is the thing claimed in the patent, and the putting of two things together is not proper, although it may reach the same end.

34th. I will put this question to you in this shape: you say this foundation and this filling described in this Warren patent
230 is the same as in the Phillips patent. You say that blocks of wood of any form set vertically upon this foundation may be used under this Gardner Warren patent; now I ask you if blocks of wood in their natural state laid upon this foundation and with this filling described in this Gardner Warren patent, whether it would not make the same pavement as described in the Phillips patent?

(Objected to on the ground that to anticipate complainant's patent the inventions therein described must be described in the prior patent so that a person skilled in the art could lay off pavement from the instructions in the patent; and that it is immaterial what might be made under the Gardner Warren patent, if the foundation therein is the only thing described.)

A. Of course it would represent the same, but the combination would not be the same at all.

35th. Why not?

A. Because one element of the combination is not claimed here at all.

36th. What element?

A. The blocks of wood.

37th. But may not blocks of wood of any size or shape, natural or artificial, be laid upon this foundation and covered by this patent?

A. No, sir; not covered by it.

38th. If blocks in their natural state may be laid and covered by this patent in combination with the foundation and the filling, would not the pavement be the same as the Phillips pavement?

A. I think there is but one thing there that is claimed in the Phillips pavement, and that is the foundation and the filling.

39th. Would it not be described in this patent as coming within the description if wood in its natural state was used in con-
231 nection with this patent with the foundation and the filling, then would it not be the same as the Phillips pavement?

A. I do not think so.

40th. Why?

A. There are only the two things claimed.

41st. I do not speak of what is claimed.

A. That is the only thing we can speak of.

42nd. There seems to be a misunderstanding as to the meaning of the question; if the wooden blocks in their natural state were set vertically upon the foundation and using the filling described in the Gardner Warren patent, would it not be the same pavement as the Phillips pavement?

A. Yes, sir; I suppose it would.

(Signed) D. FARRAND HENRY.

The signature of the witness and the certificate of the manner of taking the foregoing deposition is hereby waived.

(Signed) GEO. H. LOTHROP,
Sol'r for Compl'ts.
F. A. BAKER,
Sol'r of Counsel for Def't.
D. C. HOLBROOK,
Of Counsel for Def't.

(Endorsed:) Filed May 20, 1879. A. Mandell, cl'k.

232 *Depositions for def'ts of Thompson, Mackin and Bristol.*—Filed May 20, 1879.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell & Eugene Robinson } In equity.
vs.
The City of Detroit.

The following depositions of James K. Thompson, Thomas Mackin and Henry S. Bristol may be used in this cause without any certificate of the *affair* taking the same, and subject only to objection for competency and relevancy.

December 15, 1877.

GEO. H. LOTHROP,
Sol'r for Compl't.

233 JAMES K. THOMPSON, a witness produced on behalf of the defendant, being first duly sworn, testified as follows:

Examined by counsel for defendant:

Q. What is your name, age, residence and occupation?

A. James K. Thompson; age 59; residence, Chicago; occupation, commissioner of public works in the city of Chicago.

Q. How long and in what capacity have you been connected with the improvements made by the city of Chicago, more particularly in reference to the street improvements?

A. I have had more or less connection with the street improvements for about 16 years; I think at one time I was superintendent of streets.

Q. What kind or kinds of pavements have been laid in the city directly upon earth or sand foundation?

A. I do not recollect of any kind now, except what is called the "Stow foundation" and this that we are now laying the blocks upon the sand without a wedge.

Q. What wood pavements, if any, were laid by the city with the blocks directly upon a sand or earth foundation while you
234 was superintendent of streets; if any, please give the time the pavement was laid and its location?

A. I think that the first wood pavement that was laid directly upon the ground here was a piece that I laid myself in the fall of 1864. That was a piece at the intersection, or near the intersection, of North State and Kinzie streets; another piece was laid, I think, in '71, at the north end of Lasalle street tunnel; I would not be so positive about the time, but I think it was in '71; might have been '70.

Q. Please describe particularly the construction of the pavement represented by the model Defendant's Exhibit 27, as it was laid on the street referred to?

A. After the street was filled there was a bed of sand put over the top of the earth filling and thoroughly rammed, the filling was, and blocks were then set in rows, one inch apart, and the spaces between the blocks were filled with gravel, which was also thoroughly rammed. The blocks that were laid in '64 were cut from 6 x 6 inch timber six inches in length; that laid in '70 or '71 the blocks
235 were cut from four-inch plank, I think, and eight inches in length.

Cross-examination:

Q. Does Exhibit 27 represent the pavement laid in 1871, at the end of the La Salle street tunnel, as well as the pavement laid in 1864, at the intersection of Kinrie and State streets?

A. The only difference, as I stated in my evidence before, was that this is laid with blocks cut from 6 x 6, and the other was cut from four-inch plank.

Q. When was the pavement of 1864 laid?

A. Some time in the year 1864; I am not certain.

Q. Do you know the month?

A. No; I do not.

Q. Do you know whether it was the fore part or the latter part of the year?

A. The latter part of the year.

Q. Was it before or after the State street bridge was finished?

A. I think it was just before the approach was finished, so as to have it all in use when the bridge was done.

Q. Was there a bridge then over the railway crossing?

A. A viaduct; yes, sir.

Q. How did the road approach the railway viaduct—I
236 mean, was it an earth approach, or a pile approachment?

A. A certain distance was earth and a certain distance was pile.

Q. Immediately at the viaduct, what was it?

A. Pile.

Q. Not filled in with earth?

A. No, sir.

Q. How far did the earth filling extend from Kinrie street?

A. My recollection, about twenty feet.

Q. The balance, then, was pile work?

A. Balance pile work; yes, sir.

Q. The earth work, then, only extended over your pavement?

A. That was all; I just paved that portion where the earth was filled.

Q. How far before the present pavement was that pavement laid?

A. That I could not t. " you; perhaps three or four feet; I do not recollect.

Q. How much of this pavement was laid there?

A. A piece about twenty by thirty feet; that is my recollection.

Q. About twenty feet from Kinrie street towards the bridge?

A. Yes, sir.

Q. Did you lay it yourself in person?

237 A. I commenced it. Of course, I did not lay it myself with my own hands. I gave the men instructions how I wanted it laid, and of course they did it.

Q. Did you lay any of it with your own hands?

A. Yes, sir; I laid some of the blocks at the start.

Q. What was your position then relative to the city?

A. I was superintendent of streets and bridges; had charge of the bridges more particularly.

Q. How many men had you in your employ laying that pavement?

A. I do not recollect. A gang usually consisted of from four to six men. I do not know whether they were all there.

Q. What had you been working at previously your gang of men?

A. The repairs all over town.

Q. Had you been paving Kinzie street on the north side to State street on the north side of Kinrze street?

A. No, sir.

Q. You had been making no pavement in that locality?

A. Kinrie street was paved with boulders, and this was a little piece between the boulders and the pile work.

Q. There was some timber on there.

238 A. The timber had been recently put there; this pile work.

Q. What had the timber been put there for?

A. To sustain the earth filling.

Q. I understood you to say there was a pile of loose timber there.

A. No, sir; I did not say any such thing. I said the timber work—pile work. There was no timber there.

Q. Did you have the timber hauled there for the purpose of making this pavement?

A. I had the blocks after they were cut with the saw.

Q. Where were they cut?

A. I do not recollect. I think we had at that time an engine running. They were cut there or at some mill,

Q. The blocks, then, if you remember, were drawn there from some other locality?

A. Yes, sir; they were cut out of this board; this timber.

Q. Can you give me names of any of the workmen?

A. The foreman's name was Warner; another, of the name of Smith.

Q. What was Warner's first name?

A. William.

Q. Is he now dead?

A. Yes, sir; he is dead.

239 Q. What was Smith's first name?

A. I could not tell you, sir; long time ago.

Q. What is his address?

A. That I don't know.

Q. Is he now in the city?

A. Could not tell you that; I think likely he is.

Q. Have you seen him since that pavement was laid?

A. I have seen him several times since that; I have not seen him for some time.

Q. Can you name any other one?

A. No; I cannot.

Q. Are you sure there was any other workman engaged except those two you have named?

A. My recollection is there were three or four.

Q. Is your memory distinct as to that?

A. I would not swear to it.

Q. How long were you occupied making that pavement?

A. I could not tell; not a great while.

Q. Can't you approximate?

A. Not over a day.

Q. Were you there during the laying of the whole pavement?

A. No, sir; I got the men started—told them what I wanted, and cleared out—went away.

Q. How much did you raise the street, if any?

A. In the street?

240 Q. How much did you raise the street, if any?

A. We raised from the boulders, where the boulders stopped, up to this pile work approach; then to the bridge; I suppose, in that distance of twenty feet, about a foot; next to the pile work put in two or three feet of filling.

Q. What was there as original pavement?

A. It never was paved before.

Q. What was it?

A. Dirt, I think.

Q. Loose earth?

A. It was natural; never had been paved before; never had been a street there before.

Q. Never been traveled over before?

A. No, sir; only some travel over the railroad; there was no street in order to travel over.

Q. The original foundation was sand, then?

A. No; it was natural Chicago ground.

Q. Was it soft?

A. Ordinary ground, like it is in any other part of Chicago.

Q. You raised that with what kind of material?

A. Material as we dig out of a cellar; ordinary earth we get out of a cellar.

Q. You think you raised it about one foot?

A. Raised the whole distance at the pile work; I thought you alluded to the elevation; that is, the ascent.

241 Q. I allude only to this pavement.

A. There was three or four feet.

Q. How much did you raise it up beneath this twenty feet?

A. Between three and four feet, to my recollection.

Q. You raised, then, the road under this pavement about four feet from the natural surface?

A. Yes; the surface pitched down; [illustrating]; there, for instance, would be the surface of the street; it ran off that way; now here was the pile work; there is where the earth work was put in, the earth filling, and the pavement laid on it; Kinrie street was raised at that time. [Witness drew a diagram, which is attached at the end of his deposition, and marked Exhibit Thompson No. 1.] No. 1 is the natural surface of the street as it was before we commenced paving—commenced filling; No. 2 represents the pavement as completed; No. 3 represents Kinrie street; No. 4, State street; No. 5, end of pile work; No. 6, surface of the boulder pavement on Kinzie street; No. 7 is the pile work.

Q. The remainder of this between the pile work and the pavement, as I understand you, was piles?

A. Except the end wall that the viaduct rested on; that was stone; then it was pile work again; we run piles up there for, per-

242 haps, 130 feet, then they come to the stone abutment that the viaduct rested on; then it was pile work again.

Q. I understand you, then, to say that you raised the natural surface at the place where the street struck the piles, three or four feet?

A. Yes, sir; that is my recollection.

Q. Were you there at the time the pavement was completed?

A. I could not tell you, sir; I do not recollect whether I was or not; I was shortly after; I went over to see how it stood.

Q. Did you ever measure the distance between the natural surface and the paved surface at the piles?

A. No, sir; I never did.

Q. Now, why did you put in that kind of pavement at that particular place?

A. I put that in, sir, as an experiment; the idea had struck me as a favorable one, although I was not confident it would stand; I put it in as an experiment, to see if it would stand or not; I could not see any reason why it should not, as stone would stand.

Q. Had you ever made any pavement like that previous to that?

A. No, sir; never; that is the first I ever saw looked like it.

Q. Did you ever put down any pavement afterwards like that?

A. I never did

243 Q. Why did you not fill that place up between Kinzie street and the piles with earth?

A. I did.

Q. Without any pavement?

A. And leave a mud hole there?

Q. Why did you not put stone down there?

A. I had no stone to put there. I do not know as I should have put it there if I had had it.

Q. Have you any reason for putting this particular kind of pavement in that locality?

A. I give my reason, as a kind of experiment.

Q. That was one reason you had?

A. That was a reason. I had no stone, I know. I put it down as an experiment.

Q. Did anyone suggest to you that method of pavement?

A. There never did, sir.

Q. Were you acquainted at that time with the Nicholson pavement?

A. Yes, sir.

Q. Had any of the Nicholson pavement been laid in Chicago, at that time?

A. O, yes; quite a large amount.

Q. How much of the pavement did you lay with your own hands?

A. Well, I could not tell; perhaps not more than one or two rows across the street.

Q. Did you lay as much as that?

244 A. I think so; just to show the men what I wanted there done.

Q. What did you rest the first row against?

A. Against the planking that sustained the filling there.

Q. Plank that you had put in?

A. Yes, sir; these piles were planked up to retain the filling. I rested the first block against that.

Q. Do I understand you the piles were driven along Kinzie street?

A. No, sir; some twenty feet back from Kinzie street, I think.

Q. Do I understand you that the piles were driven at the commencement of this pavement?

A. Row of piles were driven, say, at No. 5 on the diagram, Exhibit Thompson.

Q. Were any piles driven at No. 3, at the commencement of this pavement?

A. No, sir; O, no.

Q. At which end did you commence to pave, at No. 6 or 3?

A. At No. 5.

Q. And worked towards Kinzie street?

A. And worked towards Kinzie street.

Q. You put your blocks up then immediately against the piles at No. 5?

A. Against the planks; yes, sir.

245 Q. How did you support the first row after you laid it?

A. Set them on the ground, and they supported themselves.

Q. How did you support the second row?

A. The same way; they supported themselves; being six inches square, they stood up very nicely.

Q. You used no strip to put between them?

A. No, sir.

Q. Used nothing?

A. Nothing but filling between the rows of blocks.
Q. When did you commence the filling of the first row?
A. That I could not tell you, sir.
Q. Did you fill at all with your own hands?
A. No, sir.
Q. Did you see it filled?
A. Well, I might; I am not positive; I think I did; I think I saw them filling it; that is my recollection; that is, after they got some considerable of it done.
Q. Did you see the filling of the second row?
A. I could not go into particulars, sir.
Q. Can you swear that you saw the filling of any one of the rows?
A. My recollection is I saw the filling put in over quite an amount of that pavement.
246 Q. Had you been there previous to the laying of the first row?
A. I went there with the men.
Q. How long were they filling up this space to the required grade?
A. I could not tell you that; that was filled before these men went there; it was filled by teams.
Q. When you went there with these men, then, the street was prepared for this pavement?
A. Yes; I think it was already for the pavement; might have put some sand on after we went there.
Q. Did you put some sand there?
A. Yes; there was sand on top of the filling.
Q. Did you put any sand on the pavement—on the street before the pavement was placed there?
A. I say there was some sand placed on top of that filling.
Q. Did you put any there?
A. No, sir.
Q. Did you see any put there?
A. I saw it there.
Q. Did you see any put there?
A. Well, I don't recollect whether I did or not.
Q. Did you see any ramming done to the foundation of this street before the pavement was put on there?
A. Yes, sir; I told the men to do that.
Q. Was that your own idea?
A. Yes, sir.
247 Q. What was that rammed with?
A. With a paving rammer.
Q. Which did they ram, the earth as piled in there or the sand?
A. They rammed right on top of it.
Q. The earth or sand?
A. I think the earth was rammed as it was being put therein;

that is my recollection by the parties there, and of course they would ram the earth and sand too.

Q. Did you see the earth put in there?

A. Well, I could not swear to that, whether I did or not; my impression is that I did, partially.

Q. Can you swear that you saw ramming of the earth after it was put in there?

A. Yes; I had the men ram it, I know.

Q. You may have ordered them to ram it, but did you see it with your own eyes?

A. Yes, sir; they went over it with the rammers.

Q. That you remember distinctly?

A. Yes, sir.

Q. Do I understand you to say you remember that distinctly, or is that now your present impression?

A. I remember that distinctly, the ramming of the earth; I should not certainly have put the pavement down on loose earth.

Q. That is philosophy; that is not a fact?

248 A. That is a fact; I would not do it; did not do it, at any rate.

Q. Do you remember that circumstance as a distinct circumstance, or do you now reason yourself into the belief of it?

A. I remember of having that earth rammed, sir.

Q. Now, was the earth rammed before the earth was placed over it?

A. That I could not tell you.

Q. Whether the ramming was done before the sand was placed there or after, you do not remember?

A. No, sir.

Q. Did you put the first row of blocks immediately upon the sand?

A. Yes, sir.

Q. Did you put any board between the sand and the blocks?

A. No, sir.

Q. Are you sure of that?

A. I am positive of that.

Q. Did you leave any place between the first row and the second row?

A. Yes, sir; I should think about an inch.

Q. Do you know whether any space was left between the second row and the third row?

A. My recollection is there was, between all the rows.

Q. Your knowledge of that is derived not from seeing the

249 pavement laid, but from seeing it after it was laid.

A. My knowledge is from instructions that I gave to have it laid, and of the ramming in between the blocks; that gravel was rammed between the blocks—between the blocks, rather.

Q. Did you see it rammed between every row?

A. No, sir; I could not say that I did.

Q. What was the space between the first and second row filled in with?

A. Gravel; what we call paving gravel.

Q. When was that filling put in?

A. Put in shortly after the blocks were set.

Q. Was it as soon as the first row was completed?

A. No, sir; I think there were several rows set before we put in that filling.

Q. Is your memory certain on that?

A. Well it is not so positive that I would swear positive that such was the case, but that is my memory, that there were several rows of blocks set before there was any gravel put in at all.

Q. What prevented your blocks from falling towards each other?

A. Being a size that would naturally stand; they were just the same height as they were in width—six inch block.

Q. Was there any protection between the blocks to prevent them falling against each other?

A. No, sir; nothing at all.

250 Q. Don't you know, as a matter of fact, that it would be impossible to lay that pavement, three or four or five rows of it, without putting in some partition between the blocks to prevent them from falling against each other?

A. Not by a good deal; I know it is possible; I think I could lay a hundred squares of it without putting anything between the blocks of that size.

Q. Do you remember the time of day when you commenced laying that first row of blocks?

A. I do not.

Q. Do you remember whether it was in the morning or in the afternoon?

A. I could not tell you.

Q. When this pavement was completed, did you cover it over with sand and gravel?

A. Covered it with a coat of gravel.

Q. How much gravel did you put on?

A. An inch in depth, perhaps.

Q. Did you see that put on?

A. I saw it while it was on, after it was commenced to travel over; I saw it there.

A. After laying the first row, which you say you laid yourself, and the putting on of this gravel, had you visited the pavement at all; visited the locality to see the pavement?

A. I visited it after, certainly.

(Previous question read to the witness.)

251 A. I do not understand the question exactly; after I laid the first row and the gravel was put on—I do not understand that.

Q. I understood you, the last act was covering this pavement with gravel about an inch thick?

A. Yes, sir.

Q. Now between the first act, and which was laying the first row by your own hands, and the final completion of it, the covering of the whole of this with sand, did you see the pavement?

A. Well, I could not tell you that; I do not recollect.

Q. This pavement was completely covered over, was it, with sand?

A. Yes, covered over with a body of sand.

Q. So that the blocks could not be seen?

A. The blocks could not be seen after that was put on.

Q. How long did that pavement continue there?

A. I think there was some of that pavement left after the fire, if I recollect right.

Q. Wasn't it paved over in the year 1865?

A. O, no; I think there was some there at the time of the fire. Shortly after it was laid it was taken up and a railroad track put through there, and put down again.

Q. That was the horse railroad?

A. The horse railroad.

Q. Refresh your memory from the alphabetical list of im-
252 proved streets in the city of Chicago, April 1st, 1872, (handing it to the witness,) from Kinzie street to Michigan street, on State street, wooden block pavement, 1865, James Steele; and state whether or not you still think your former answer correct?

A. Yes, I think so. I think that Kinzie street at that time was paved with boulders, and this pavement Steele put down from Kinzie street north was wood. That is my recollection.

Q. You think State street was paved north?

A. Kinzie street was paved with boulders down as far as Cass street, I think, but I would not be certain about it. But I know it was boulder pavement, and this pavement spoken of there commenced at the north side of Kinzie street and continued north.

Q. You think that State street was paved in 1865 by Steele, north of Kinzie?

A. Yes, sir.

Q. But not south of Kinzie?

A. Not south of Kinzie.

Q. Are you sure about that?

A. My recollection is I am pretty positive about that. I know the railroad was laid in there, I don't know but in 1865, and they cut through this pavement I laid—cut it, laid down their tracks, and replaced it again in some haphazard way. I know it was not put down properly. I do not think there was anything put down
253 in 1865, except it was done by the railroad, and ordinary repairs.

Q. When did you say that pavement was taken and built over?

A. My pavement?

Q. Yes, sir.

A. I think it was there at the time of the fire, parts of it.

Q. Is it there to-day?

A. I could not tell you; the grade was raised.

Q. When was the grade raised?

A. Raised in '72; I think '72; it was after the fire, anyway.

Q. How much above your pavement is the present grade?

A. That I could not tell you—perhaps two or three feet. This was after the fire. Mr. Watson took up a block of that pavement and brought it over to the office; had it there a long time.

Q. Mr. Thompson, did you ever apply for the patent of that?

A. No, sir.

Q. You have applied for a patent for wood pavement, have you not?

A. Yes, sir.

Q. Is the patent No. 100,339, dated March 1st, 1870, for an improvement in wood pavement, a copy of which I now hand
254 you, a copy of the pavement patent which you obtained for your improvement?

A. Yes, sir.

Q. Introduced at Thompson's Exhibit No. 2?

A. Yes, sir, I got a patent on that.

Q. This patent which you obtained rests on a broad foundation?

A. Yes, sir.

Q. And consists of thick and thin blocks of wood placed together?

A. Yes, sir.

Q. When did you apply for this patent, Mr. Thompson?

A. I declare I could not tell you, could not tell the time it was issued or anything else, nor when I made the application.

Q. Did you ever put down any of the pavement described in this patent?

A. Yes, sir.

Q. Where?

A. Put down at the intersection of Twenty-second and South Park avenue, and I put some down at the east approach of Kinzie street bridge.

Q. At the time you put this down were you acting as the superintendent of the city?

A. Yes, sir.

Q. Did you put this down at your own or the city's expense?

A. City's expense, and gave it to them.

255 Q. Is that all you ever laid?

A. That is all I ever laid of it; yes, sir.

Q. Why did you not lay more?

A. The city did not see proper to adopt it.

Q. It was a failure, was it not?

A. I could not tell you; I guess it is there yet. It might be a very expensive mode to lay, that they did not adopt it.

Q. How much timber did you use in making this pavement marked Exhibit 27?

A. I could not tell you, sir.

Q. Did you ever, in any of your conversations with Mr. Stowe or either of the Stowes, did you ever refer to this pavement which you had laid in 1864, prior to the year 1872?

A. I might have done so.

Q. At any time when Mr. Stowe applied, either to the board or to individuals of the board, or in any way, to lay his pavement in the city of Chicago; have you ever stated that you laid a pavement in 1864 which substantially covered the same thing?

A. No, sir.

Q. Do you know Mr. G. T. Pettygore?

A. No, sir.

Q. Do you remember that Mr. G. T. Pettygore called at the office of the board of public works, sometime in February, 1874, and had a conversation with you in reference to the "Free pave-
256 ment," or the Chicago pavement, during which interview Mr. Pettygore took out a letter received from one Armstrong, and read it to you; a letter relating to what was termed "The Chicago Free Pavement;" a letter of inquiry; did you not then and there say to Mr. Pettygore that the pavement called the "Free Pavement," or the "Chicago Pavement," was first laid in 1864, by you?

A. I might have done so. I do not know Mr. Pettygore at all.

Q. Did you not also say at that interview that the blocks laid by you in 1864, were laid close together on the ground?

A. No, sir. I never said that to anybody,

Q. Did he not then say that at the intersection of Lake and State streets, the pavement laid was not laid like that laid by you, Thompson, to which you replied that it made no difference?

A. No; I could not say that; I always regarded that "Stowe" foundation as a legitimate patent; I certainly could not say that; I never made any such statement as that to anybody; I am positive of that.

Q. You had no such interview with G. T. Pettygore at any time?

A. Not that I recollect of at any time. Never such a language passed between anyone and me.

Q. Do you know J. K. Lake?

A. Yes, sir.

257 Q. Do you remember having an interview with him with reference to the Stow pavement?

A. I do not.

Q. Did not Mr. Lake call at the board of public works on or about the 20th of April, 1874, and see you and hand you a notice signed by Henry M. Stow, patentee and owner, dated Chicago, Feb. 23d, 1874? (And here shown the witness, and introduced in evidence as Complainant's Exhibit Thompson 3.)

A. My recollection is that Mr. Lake did hand me one of these circulars.

Q. Did you not then and there say, in substance, that you made no

objection to the contents of that notice, except that the size of the blocks in your pavement should be stated six inches square instead of seven or eight inches square, as stated in the notice?

A. I think likely I might have done so; I do not recollect any conversation between us on that point; it is very probable I did.

Q. Did you not then say that a portion of the model representing the square block pavement was the same pavement you laid in Chicago in 1864?

A. No, sir; I always said that my pavement was laid an inch apart instead of close together that way.

Q. Didn't you say that this pavement, referring to your four sided block pavement, represented by the model Exhibit Thompson 4, was the same kind of pavement that you laid in Chicago in 1864?

258

A. Not if it was that model, I did not; with an exception of mine, I might have said that with the exception of mine being laid apart with a space between them.

Q. Didn't you say that without making any exception then?

A. I did not, sir; I always contended with Mr. Stow that that was not a representation of mine.

Q. Will you swear that you did not say that to Mr. Stow in presence of Mr. Whitney?

A. To the best of my recollection I will swear to that; my recollection would be that I never said anything of the kind; that mine was laid in that style, marked Exhibit Thompson 4.

Q. Is your recollection perfect upon that point?

A. I am positive, as near as a man can be, that I never said anything of the kind, would be my recollection; I do not think anybody is perfect on any point.

Q. Did you say this morning in your direct examination that the pavement of 1871, the Lasalle st. pavement, was the same pavement as laid by you in 1864?

A. No, sir.

Q. You don't mean then to be understood as saying that?

A. I did not say it, with the exception of 6 by 6, and that was cut from four-inch plank.

Q. With that exception what do you mean; to say the two pavements are identical?

259

A. I understand that way; yes, sir.

Q. Do you know who laid that pavement?

A. No, I don't; I think James MacBean; I am not positive.

Q. Do you know any of the workmen?

A. No, sir.

Q. How do you know that the pavement of 1871, with the exception you have have named, was like the pavement you laid 1864?

A. Only by information from Mr. Watson and Mr. MacBean.

Q. Do you remember at the time Mr. Henry M. Stow was making an application to the authorities of the city of Chicago, to lay anyone of his pavements, that you stated as a reason—as an objection

to that pavement or to anyone of his pavements—that it would be impossible to lay a pavement in the city of Chicago on a sand foundation?

A. No, sir; I don't think I ever said anything of the kind.

Q. Did you not say to Mr. Stow on various occasions that such a in the city of Chicago would be impracticable without a broad foundation?

A. No, sir.

Q. Did you not urge that a various times, to Mr. Stow, as an objection to his pavement, that it was an impracticable pavement because the foundation was not sufficiently sure?

A. Never to my recollection, sir.

Q. That it would settle uneven?

260 No, sir.

Q. And the surface would become uneven thereby?

A. No, sir; I always took the ground, if you will allow me to put in the testimony, that if a stone could stand upon Chicago surface—Chicago earth—it would certainly do it where it had a greater bearing; that is my opinion about a pavement and ground.

Q. You never stated such an opinion to Mr. Stow, either in substance or anywise, either directly or indirectly.

A. No, sir.

Q. Did you not state it was your opinion at the time the Stow pavement was being laid at the intersection of Lake and State streets, that it would not stand because of the imperfect foundation?

A. No, sir; I may have stated this in regard to the Stow pavement, that I did not believe that the Stow or any other pavement would stand where the foundation gave way.

Q. Did the experiments in laying the foundation in 1864, relate in anywise to the patent which you obtained March 1st, 1870?

A. No, sir; nothing to do with it.

Q. Did you ever call Mr. Henry, M. Stow's attention to that pavement in 1864, prior to the year 1872?

A. I don't think I ever did.

Q. Did you ever call his attention to it at any time—Mr. H. M. Stow?

A. No, sir; I do not think I ever did.

261 Q. Do you know that this pavement, Exhibit 27, made in 1864, was ever laid in any other place, either in Chicago or elsewhere, than the places you have named?

A. No; I do not know of any other place, sir.

Re-direct examination:

Q. Did the pavement which you laid in 1864, like the model, Exhibit 27, extend clear across the street or roadway?

A. Yes, sir.

Q. Had the result of the laying of this piece of pavement anything to do with the subsequent laying of pavements upon sand by or for the city?

A. My impression is that it had, sir.

Q. You were asked if you ever applied for a patent for this form of pavement, and answered that you had not. Why did you not?

A. For the reason that I thought there was nothing in it to obtain.

Q. Does the complainant's model, Exhibit Thompson 4, correctly represent the pavement laid by you on State street, near Kinzie, in 1864?

A. It does, with the exception of the space between the rows of blocks.

Q. Part of the way, then, the blocks were laid in contact, with spaces between the rows, as shown in model, Exhibit 27?

A. Yes, sir.

Q. How did this section of pavement stand wear, as compared with other wood pavements then in use in the city?

262 A. I was very well pleased, sir, with its wear. Until the pavement was torn up for the purpose of laying the railroad it seemed to keep its position perfectly.

Q. What difference does it make, if any, whether the blocks are cut from six or four-inch timber?

A. I think blocks cut from six-inch timber would, perhaps, stand better than those cut from smaller pieces, having a greater bearing surface.

Re-cross examination:

Q. How did the laying of the pavement in 1864 have anything to do with the subsequent laying of pavement in Chicago?

A. I think the idea was developed that a pavement upon a sand foundation would stand, would not bend down into the earth, as many supposed it would.

Q. Did you state that to any member of the board of public work?

A. I think I may have done so; I am not positive.

Q. On the corner of State and Kinrie streets?

A. I think not, sir; I do not recollect of any time of any one going with me.

Q. Did you ever speak to McArthur, Letz, or Carter in reference to that pavement?

A. I may have done so; I do not recollect.

Q. You may not have done so?

A. I may have not done so.

Q. Isn't it a fact that you never did?

263 A. I would not say that it is a fact; I think more than probable that I did after I found the blocks would stand; of course I would not swear to that.

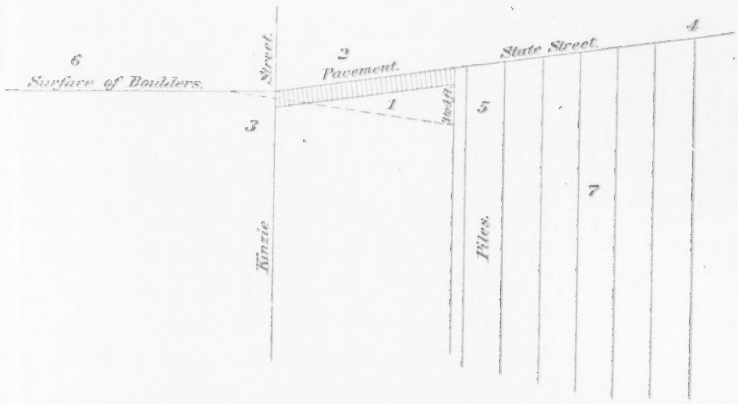
Q. Wasn't the opinion of the members of the board of public works confirmed as to the solidity of a sand foundation, on the pavement laid by Mr. Stow at the intersection of Lake and State streets?

A. I cannot answer that, sir; do not know what they confirmed their opinion on.

Q. Was there any pavement laid directly on the sand or earth foundation in the city of Chicago prior to the laying of the Stow pavement on Lake street and on Market street, except the pavement you laid in 1864, and the Lasalle-street tunnel in 1871?

A. I do not know of any, sir.

Exhibit "Thompson 1."



264 THOMAS MACKIN, a witness produced on behalf of the defendant, being first duly sworn, testified as follows:

Examined by counsel for defendant:

Q. What is your name, age, residence, and occupation?

A. My name is Thomas Mackin; live at 276 Indiana street, north side; about 46 years old; occupation, contractor.

Q. What line of improvements have you been making as contractor?

A. Speciality principally is paving streets—walling, filling, and paving.

Q. How long have you been engaged in that business?

A. 12 years, I think.

Q. Do you know of any pavement having been laid between the State-street bridge, or viaduct, and Michigan street, in the city of Chicago? If so, state what kind of pavement was there laid; when, and by whom?

A. The pavement that was laid on that approach, I recollect, was in '64; laid under the supervision of Mr. Thompson, my foreman, by the name of Warner, I think, and men laid it down. That pavement was laid on ballast and sand or gravel, and I am not distinct in my recollection whether it was 4 x 6 or 6 x 6 block; I cannot say

which, but it was one or the other; laid down on the sand and filled between with gravel or sand ballast—some kind of gravel. I don't know whether it was joliet or bank gravel—some kind of bank gravel. I don't know where it was got.

Q. What do you mean by the term ballasting, sand, or gravel?

265 A. The designation of gravel is what is called lake-shore gravel; that is, a little stone that is free of sand. That is one kind. There is another known as bank gravel or pit. That is got in a bank of ground. There is another kind of gravel we used to use that is taken off the lake shore, washed, and screened. That was called Nicholson pavement gravel, and that is what we used for that; but my recollection of this gravel used there was bank gravel.

Q. Then what you mean by ballast, sand, or gravel——

A. Is a mixture of gravel and sand got from the beach for the bed foundation.

Q. Was the filling between the rows laid there rammed in any way?

A. My recollection is that it was filled in and rammed. First tamping iron that I ever saw used was at this place. They tamped the gravel down between the rows.

Q. By tamping iron do you mean an iron like the one shown in Exhibit Watson 1?

A. Yes, sir; that is the diagram. That is the first one I ever saw used in that way. The one we had before that was a blade laid down between the blocks and pounded with a pounder, and this one was the first I ever remember of seeing used in that way.

Q. Did you see that pavement while it was in course of construction and have any conversation with Mr. Thompson in reference thereto? If so, please state what was said.

A. Yes, sir; I was on the work there, and Mr. Thompson

266 and I were sitting on the rail; he says, Mr. Mackin——

(Objected to.)

The WITNESS: He says, why won't that be the future pavement of Chicago? He says, I have a great mind to get a patent upon it, and I said I thought it was first-rate; thought it would be a first-rate pavement.

Cross-examination:

Q. Are you engaged in the paving business?

A. Yes, sir.

Q. Are you interested in this litigation in any way?

A. Well, I suppose it is claimed I am laying down this pavement?

Q. Haven't you given bonds from time to time to the city to protect them against royalty under patents covering the pavements which you put down?

A. I don't remember that I have.

Q. Is it not a fact that you have?

A. I don't know. I can't say whether I have or not. It may be that I have.

Q. Don't your contracts with the city bind you to protect the city against royalties of pavements which you put down, or haven't you in some cases?

A. I think in some cases such a thing——

Q. Were you laying the pavements in 1864?

A. Was I laying pavement?

Q. Yes.

A. Well, I don't mind. I think I was. I do not remem-
267 ber the date that Mr. Greely and me were partners. The first block that I laid on my account was opposite the old custom-house on Dearborn street. From Madison to Monroe. That was the first I did on my own account.

Q. Do you remember when that was?

A. I do not remember the date exactly.

Q. Was it before or subsequent to 1864?

A. I could not state. Some time about that time; best of my recollection.

Q. Prior to the laying of that pavement, whenever that was, you were laying pavements as partner with Mr. Greely.

A. Called the Nicholson pavement.

Q. When did you first begin to lay the pavement upon a sand, or gravel, or earth foundation, with the blocks resting directly upon such foundation?

A. First job I did of that character I think was Kinrie street.

Q. Give me the date of that.

A. I think it was two years now that I laid that street.

Q. Didn't you, in that case, guarantee either the city or the property owners against royalties upon patents covering the pavement which you put down?

A. A gentleman by the name of Stow being around circulating circulars, stating to the property owners that he would hold them responsible for a royalty upon his so-called patents, and give some little annoyance to the contractors, some of the people on the street thought that there might be something growing out of it that would not be all right and they required an indemnifying bond. I
268 think in that there was two that required it of me, and I told them I would most cheerfully give it, which I did.

Q. So you finally gave the bond?

A. I think in two cases, all that asked me, I cheerfully acquiesced.

Q. Have you done the same thing since then, when they have asked you to?

A. Haven't anybody asked me of late at all. There was a great many began to make up their minds that there was a great deal of humbuggery about this. I was notified myself. I have quite a little piece laid down, of pavement of that kind, and I was notified myself.

Q. Are you certain about the time of laying down this Thompson pavement on the approach of State street bridge?

A. Well, sir, my recollection is pretty clear upon that point. There was a contract for the filling of those approaches, and also for

the filling of the centre pier of the bridge, when they constructed that new bridge there, and I was a bidder upon that contract. A young man by the name of John Anderson beat me on filling the south side approach, but I got the work on the centre pier, so that I was engaged at the same time upon that work and Thompson on the other side, and Thompson and Warner superintended it, and Anderson did the filling on the south side, and I did the center pillar, and I was on the work every day.

269 Q. You do not remember the size of the blocks, definite, used on that pavement?

A. Well, it was 4x6 or 6x6, but I cannot tell which it was. That was the character of the block.

Q. Square blocks—square edges?

A. Square blocks; that is my recollection.

Q. How did they preserve the space between the blocks whilst they laid it down?

A. They laid the blocks down with the hand and eye, I suppose. I did not see any report.

Q. No guide?

A. No guide or guage of any kind; just laid it right down.

Q. Laid the block straight across the street or diagonally?

A. Well, my recollection is that they laid straight—that is, formed an arch, and laid them across from curb to curb.

Q. The rows of blocks went straight across the street?

A. I think it; I couldn't swear positively, but my recollection is they were put down straight.

Q. Where did you begin to lay the pavement, next to the bridge or further north?

A. There is considerable of an ascent; they were coming down that time; there was a new railroad laid down there, and my recollection is they commenced from the—that I cannot state positively, but my recollection is they commenced on the north end—on the south line of Kinzie.

Q. You worked toward the bridge?

270 A. That is my recollection; I passed them every day, because I was working on the bridge at the same time myself.

Q. How much of that pavement, according to your recollection, was laid down in length—along what street; State street?

A. Well, there was not a very great deal of it laid down; the railroad cars run under the approach, and there was a large stone abutment built near the river—a large stone pier built there that supported the work of the bridge, a viaduct, and then there was, I think, another one—I think another stone wall; I won't be certain, but I think there was another stone wall north of that, so that the place where they laid down this pavement would not be over, I think, 180 feet; probably not that much.

Q. The place between these two stone abutments?

A. No; between Kinzie street and the abutment—the south abutment; I remember very well; I used to store goods in under there;

I remember about the construction of that bridge approach; it could not be over 180 feet.

Q. Was that abutment to support the viaduct that was constructed over the railway, or was it the abutment of the bridge?

A. No, sir; it was the trestle-work of the bridge; the cars were run east and west, and there was a large space that was devoted to the railroad, and a large space outside of that that was supported by timbers.

271 Q. Then this pavement was laid, as I understand you, from the north abutment, which supported the viaduct over the railway, towards Kinzie street, was it?

A. Yes, sir.

Q. It did not come down, then, to State street bridge?

A. Come down to the bridge?

Q. Yes.

A. The pavement? I don't think it did. I don't think it come all the way down.

Q. Did it reach as far as Kinzie street, that same kind of pavement?

A. I think it did.

Q. The north end of the viaduct, then, rested on wooden abutments—supports?

A. That is, a portion of it. My recollection is, as I stated before, it was about 180 feet of this pavement that was laid from Kinzie street, going south. The support of the viaduct, I think, was timbers, and its two walls. I think there were two supporting walls—one immediately at the river, and the other north of that.

Q. Did you ever have more conversation with Mr. Thompson whilst that pavement was being put down?

A. Not that I remember, upon the merits of that pavement;—might have talked about other matters connected with the bridge.

Q. I mean about the pavement specifically?

A. Nothing that I remember but that conversation, and that was then.

Q. Where were you when that conversation occurred?

272 A. We were on the bridge, I think, on the railing coming down, sitting there.

Q. Was that manner of laying the pavement new to you at that time?

A. Yes, sir.

Q. First you had ever seen of it?

A. It was the first that I had ever seen or heard of those pavements laid down in that way.

Q. I was not asking you what you heard, but what you had seen. How long was that conversation that you had with Mr. Thompson about that pavement?

A. Well, I don't know. It was not very long, I don't think. I have asked him afterwards——

Q. He suggested it would be a good pavement for the city to adopt, did he?

A. Why it would not be the future pavement of Chicago.

Q. He was then acting in some official capacity, was he, for the city?

A. He was, I think. He was the superintendent of the board at that time.

Q. And had general charge of the repairs and improvements of the streets, did he, for the board?

A. Yes; I think it was under his supervision—under the board. I think he was the head man.

Q. (Handing witness a paper.) Does that rough sketch represent in a general way the situation of the piers and the abutments, and piece of filling in and paving, to which you have referred?

273 A. Yes, sir; that is what I call the intersection of Kinzie street and the approach of the bridge. It started on the end on the general raise, probably in that proportion.

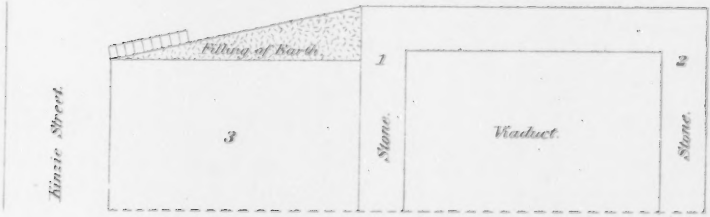
Q. In that way?

A. In that way.

Q. Now, this between Kinzie street and the first pier was filled in with earth, as I understand you, or partially so?

A. Partially so.

Exhibit "Mackin 1."



Q. Between Kinzie street and this support here marked 1 was all open, was it, underneath?

A. Well, there were heavy timber thrown across.

Q. I mean underneath—I don't mean all open, because there is a roadway between Kinzie street and that support?

A. From the approach of Kinzie street going south I estimated 180 feet that timbers were thrown across and filled in between. There were, I think, 180 feet.

Q. I mean what was the distance between the pavement laid by Thompson and the first abutment at the end of the viaduct—nearly the end of the viaduct?

A. I stated, to the best of my recollection, it might be 180 feet that there was from the intersection here.

Q. Do you understand my question?

274 A. I do, sir.

Q. From the end of Thompson's pavement up to the abutment of the viaduct marked 1 what is the distance?

A. I could not tell you where the pavement stopped.

Q. You don't know then?

A. I don't know where the pavement stopped.

Q. Do you know what proportion of this pavement laid by Mr. Thompson was on timbers, and what proportion on solid dirt?

A. I do not.

Q. How much of this pavement did you see laid?

A. I saw the whole of it laid.

Q. Where were you standing?

A. I told you I went across there every day; I was working on the center pier; I was working on the same work myself, on the bridge.

Q. You saw the whole thing laid. Did you lay any of it with your own hands?

A. I did not.

Q. Were you present at the time the whole thing was laid?

A. While it was constructing, I told you, I was going back and forth

Q. Were you present at this particular spot?

A. I was, sir; I saw that particular pavement laid.

Q. You saw it not by standing but by passing over it?

A. Standing, sitting, and walking. I sat sometimes on the edge of the rail.

Q. How many days were they occupied laying that pavement?

275 A. I cannot tell; I was not keeping time.

Q. Yet you are sure you were there all the time it was laid?

A. Yes, sir; before and after.

Q. How many men were employed in laying it?

A. I don't know.

Q. Yet you were there all the time it was being laid?

A. You don't understand, I guess, my answer.

Q. Were you or were you not there?

A. I was passing there.

Q. Then you were not there all the time it was being laid?

A. Occasionally passing back and forth.

Q. You occasionally passed over it. Did you not say a little while ago you were there all the time it was being laid?

A. Around the works there; I was working on the same job, on the other side; that is, the construction of the bridge there—other side.

Q. Then you were not at the pavement there all the time the pavement was being laid?

A. You mean standing there, and waiting and watching and looking at it all the time; is that it?

Q. You were not at the pavement all the time it was being laid?

A. I told you I was there when they commenced that, and getting through, and while it was in construction; will that answer?

Q. No, it won't answer. Were you at the pavement during the time it was being laid? Please answer yes or no.

A. I don't understand anything about the question at all.

276 Q. You can understand that question. Now, according to your best recollection, Mr. Mackin, how many days were consumed in laying that pavement?

A. Wasn't keeping time, sir; don't know.

Q. Did you see the first row laid?

A. I don't think I did.

Q. Did you see the last row laid?

A. I don't think I did. I know when it was finished.

Q. Did you see it at any time between the laying of it—the first row and the last row?

A. Yes, sir.

Q. Did you see it at all before it was completed?

A. I did.

Q. How many rows had been laid at the time you saw it?

A. Don't know; didn't count it.

Q. Was it about half the pavement?

A. I saw them soon after they started; was there when it was finished.

Q. When it was finished it was covered with sand, wasn't it?

A. I do not know whether it was covered with sand or not; I think it was; I don't know; I cannot say whether it was or not.

Q. Did the surface of the blocks appear?

A. My recollection is it did.

Q. Surface of the blocks appeared after it was finished? Did it remain long in that condition, the surface of the blocks appearing?

A. I have not taken any particular notice.

Q. How many weeks or how many months did it remain

277 in that condition?

A. I don't know.

Q. Didn't you pass over it after it was finished?

A. I did, sir.

Q. Pass over it every day?

A. Might be every day; might be three times a day.

Q. You can't tell whether it was covered with sand or not?

A. No; I can't.

Q. Was there any caol-tar or pitch on it?

A. Not to my recollection.

Q. How does it happen you are so distinct in your recollection of the fact that this pavement was put down on a sand foundation, and yet you cannot tell whether it was covered with sand or not? Can you explain that?

A. I don't know whether my eyes were shut when I went over there or not; my eyes were open, and I saw the sand foundation.

Q. Wasn't your eyes open when you passed over it after it was

completed? Yet you cannot say whether it was covered with sand. With whom have you conversed in reference to the laying of that pavement lately?

A. I have been talking a good deal about pavements, generally, of different kinds, lately.

Q. What do you mean by that?

A. Talked with contractors and property owners; had a long talk this morning with one in reference——

Q. Have you talked with Mr. Thompson with reference to the quality of that pavement?

278 A. I have talked with Mr. Thompson on several occasions about that pavement.

Q. Have you talked with Mr. Thompson, or the solicitor, about that pavement of '64?

A. I think I had a talk with Mr. Bond about it; I am not certain of that either; whether I did or did not.

Q. With what other parties have you conversed with reference to the '64 pavement?

A. I could not tell how many.

Q. When was your last conversation with Mr. Thompson with reference to that '64 pavement?

A. I cannot remember when.

Q. Was it a week ago?

A. In reference to that pavement? I don't know when I had anything to say to him about it.

Q. You never conversed with Mr. Thompson in reference to that '64 pavement?

A. I never said any such thing. I did at the time it was laid.

Q. Haven't you, since then, conversed with him?

A. I may have.

Q. Have you?

A. I don't know whether I have or not; I say I may have.

Q. Didn't you yesterday converse with him with reference to it?

A. I don't think more with him about this pavement than others.

Q. Didn't he describe to you the manner in which he laid that '64 pavement?

279 A. Not much.

Q. Did he any?

A. Not to my knowledge.

Q. Had he to your knowledge?

A. No, sir.

Q. Did he have a conversation with you in reference to the manner in which he laid that '64 pavement?

A. We talked about it on the bridge that day about the quality of that pavement.

Q. Did he on any other occasion?

A. Might have.

Q. Did anyone else ever converse with you in reference to the manner in which that '64 pavement was laid, except Mr. Thompson?

A. I cannot remember any; might be a hundred, might be. I don't mind.

Q. Was it possible to discern the manner in which that pavement was constructed, after it was finished?

A. Yes, I suppose, if you examined it.

Q. I mean looking at it from the surface?

A. No; I don't know as you wouldn't probably know what it was without you went in careful to examine it.

Q. Could you examine it from the surface?

A. Give it your attention you might, if you understood anything about it.

Q. Could you tell whether it was on a sand foundation by looking at it from the surface after it was completed?

A. I think not.

280 Q. Then you could not tell by looking at it from the surface what kind of a pavement it was?

A. Tell it was a wooden block pavement.

Q. That is all you could tell about it?

A. If you were expert and examined it minutely, you would be able to tell.

Q. If the top was all covered over with dirt you could not tell it was a wooden block pavement?

A. Yes, sir; you could tell that with your eyes shut.

Q. If it were covered half an inch with sand or gravel?

A. Yes, sir; you could feel of it with your feet; I could.

Q. Suppose it was covered an inch and a half?

A. Suppose it was.

Q. Suppose it was covered a foot, could you feel it then?

A. Then you would have to dig down a little.

Q. How much of this pavement lay directly on a sand foundation?

A. And how much of it on a dirt foundation? This pavement in question here?

Q. Yes, sir.

A. I cannot answer you that. I stated before there, that I did not know where it ended—where Mr. Thompson ended. Could not put my hand down and tell the distance, the length on the sand. I could not tell where he stopped.

Q. What portion of it was sand foundation and what portion of it was on dirt?

A. I don't know anything about a dirt foundation. I don't know anything about it. I told you there were timbers down and

281 filled with dirt.

A. Do I understand you to say a portion of the pavement was laid directly on a sand foundation and a portion of it on a pile foundation covered with sand?

A. I answered that question about three times, I think.

Q. What is your answer? Answer it again; it is not very distinct.

A. Just let him read the evidence (referring to the reporter) and see whether it is or not.

Q. Do you refuse to answer that question?

A. I say I have answered that question three times.

Q. Won't you answer it again?

A. Yes, sir; as long as I am not thoroughly understood.

(The 762 question read to the witness.)

A. What was my answer to that? This portion down here I told you before was timbers thrown across here, filled with dirt between and over; that is, down here to the intersection; intersection of Kinzie street and where it was vacant underneath or where the passage ran under.

Q. Call it No. 3 or Exhibit Mackin 1.

A. There were timber thrown across, I suppose to keep the structure together; piles driven down both sides.

Q. After number 3, what then?

A. I don't know how far. I cannot say whether he laid any blocks over that. I suppose and beyond. I cannot tell. I don't know how far he went.

Q. Mr. Mackin, can you state when was the first time you saw this tamping iron used?

282 A. The first of these tamping irons I ever saw was with Warner on that occasion. It was afterwards objected to using that, though Mr. Thompson made it very feasible to the board that it was a better mode of ramming the pavement, striking it down that way (illustrating); the former went with a blade between the blocks, striking it down with a heavy maul that was called a pavior's tool. I suppose you have got an exhibit there.

Q. Called a swedge?

A. Yes, sir; it ran along with a man holding it and another man srtiking it down. The first I ever saw of that kind was with Mr. Warner about that work. That is this exhibit shown here, Watson 1. That is it. It was a new tool altogether in the conistruction of pavements so far as we knew anything about it here in the city.

Q. Was he tamping iron you have described similar to this Exhibit Watson 1?

A. Something similar to that.

Q. Which side of the approach was it?

A. (Referring to Exhibit Mackin 1.) Call the viaduct this here; that is the approach to the viaduct that I have reference to there, from the bridge down to Kinzie street; to the river abutment.

Q. You were between Kinzie street and 3?

A. Between 3 and the line of Kinzie street.

Q. It was between Kinzie street and 3 on this diagram, wasn't it?

A. Yes, sir.

Q. He sitting or standing up, which?

283 A. I cannot tell.

Q. Were you sitting or standing?

A. Sitting on the rail; rail lay in a position like this (illustrating.)

Q. There was a rail?

A. I don't mind whether there was; I don't know whether it was a rail or sidewalk, or not.

Q. Was there any railing to the sidewalk?

A. I think there was.

Q. Were you sitting on the sidewalk, or railing of the sidewalk?

A. Standing, and partly sitting, leaning against it.

Q. Which side of the road was it?

A. Do not swear positive which one.

Q. Was there a sidewalk on both sides of the road?

A. I think there was.

Q. With a railing?

A. I think so.

Q. Now it was on that sidewalk that you stood when Mr. Thompson uttered those memorable words?

A. Right there.

Q. Do you remember whether it was in the morning or evening; do you remember the day of the week; do you remember the day of the month?

A. I do not.

Q. Do you remember the year?

A. My recollection is it was in '64.

Q. Do you remember whether it was summer or winter?

A. I don't know but coming on in the fall; I think it
284 was.

Q. Was it warm or cold?

A. That I cannot tell you exactly; don't remember whether the sun shone on that day or not.

Q. Did you have an overcoat on, or were you in shirt sleeves?

A. I think I did not have an overcoat on.

Q. How was it with Mr. Thompson, did he have an overcoat on or shirt sleeves?

A. I don't know; didn't view so close at that.

Q. Are you sure whether it was the spring or fall of the year?

A. My impression was it was in the latter part of summer, or coming on in the fall; I think it was in the fall; I am not certain; could not swear positive; ten or eight years long time to have a recollection of this kind, that you have no interest in.

Q. Have you united with any contractors in paying the expense of this suit?

A. I understand of a party here that this suit is against the contractors as well as the city.

Question 818 read to the witness.

A. I have.

HENRY L. BRISTOL, a witness produced on behalf of the defendant, being first duly sworn, testified as follows:

Examined by counsel for defendant:

Q. What is your name, age, residence and occupation?

A. Henry L. Bristol; age, 55; civil engineer; residence, 1149 Michigan avenue.

Q. What business were you engaged in during the years 1863, '4 and '5, or long at that time?

285 A. I was in the employ of the North Chicago City Railway.

Q. Did you lay any tracks for that company across State street bridge and its approaches; if so, when?

A. I laid tracks on the approaches, on the wooden approach, and viaduct along the approach in the year '64.

Q. While laying this track did you have occasion to take up any pavement at the north approach of State street bridge?

A. Yes, sir.

Q. How did you find that pavement constructed; please answer fully as to the construction?

A. It was constructed of blocks six inches square, cubes, and laid upon the filling; timber taken and sawn into pieces six inches long, which would make them a cube; that is my impression of the form of the block.

Q. How were the blocks laid in relation to each other?

A. A space between them.

Q. What was the space?

A. Sand or gravel; it was fine gravel I should think; it would not take very coarse gravel for the spaces; my memory of it was something like three-quarters of an inch.

Q. How were those spaces, between all the blocks or between the rows of blocks?

(Objected to as leading.)

A. I think they were between the rows.

Q. How much of it did you take up in laying the track?

A. Probably about 16 feet in width.

Q. How did you relay it?

A. Our track was about 14 feet from outside to outside, and

286 had to take up more than that width in order to fit in.

Q. How did you relay it?

A. Same as I found it, as near as I could.

Cross-examination:

Q. Just state how you relaid it if you remember; if you don't remember please say so.

A. I remember how I did it if I can only succeed in stating it; I did not disturb the foundation where the blocks were taken up, and when the track was completed brought to gauge, and then I repaved in the manner as I found it.

Q. I want to know what manner that was; just state how you repaved it, giving us the modus operandi.

A. I put the blocks in the same rows corresponding with those I had taken out and filled in the spaces, and when we came up against the rail I had of course to fit the blocks to fit my rails both sides;

then when I got them places as near in the same position that they were with the old work I did not disturb, I rammed it in with sand.

Q. Is your memory distinct as to that?

A. Yes, sir.

Q. That is not the modus operandi of constructing pavement latterly, is it?

A. No; that has made an impression, sir, on my mind; it was the first piece I ever saw put in in that way, I did not know there was such a piece in the city until I ran across it in this track; I never had seen anything like it or heard of anything like it.

Q. Did you make use of a tamping iron?

287 A. No, sir; I did not have them.

Q. Had you ever seen a tamping-iron prior to that time?

A. Yes, sir.

Q. Did you ram the place at all?

A. No, sir.

Q. What with?

A. Our shovels.

Q. Did you put in sand or gravel?

A. Well, it was gravel, not coarse, but still it would not come under the head of sand.

Q. Do you remember what the foundation was at the time you took up the blocks?

A. My impression that of gravel. I did not disturb it; had no occasion to; did not dig into it.

Q. Can you swear positively whether it was gravel, sand, or wood?

A. I can swear positively it was not wood.

Q. No wood then?

A. No, sir; under the portion that I disturbed or took up.

Q. Where did you commence taking up? At Kinzie street?

A. No; it was at the end of the bridge, this piece of pavement—end of the wooden approach.

Q. Did you work towards Kinzie north?

A. We laid our track from Michigan street up.

Q. I don't know where Michigan street is. Can't you answer my question, if you worked north from the bridge to Kinzie street, or from Kinzie street to the bridge, which way?

A. Well, in '64 we commenced laying our track on the

288 bridge, and laid it to the north end of the approach, which was not a great way from Michigan.

Q. That was in '64?

A. Yes.

Q. What did you do in '65?

A. In '65 we laid the track in Michigan street, and connected with the track we put on the bridge, on the approach to the bridge at the time it was built the year before.

Q. I am talking about the track on which the pavement extended from Kinzie street south; did it or did it not?

A. No, sir.

Q. Did it extend on State street from Kinzie street south?

A. No, sir; it did not come to Kinzie street, my memory is.

Q. Where was it?

A. It was between Kinzie and Michigan. This piece of pavement, I should think you might call it this piece you are questioning about. I should think in round number, say about the middle of the block.

Q. Between Kinzie & Michigan?

A. Yes, sir; between the north line of Kinzie and the south line of Michigan.

Q. How much pavement was there; half a block?

A. No, sir; not but a very little of it.

Q. How many feet?

A. Perhaps 30 feet.

Q. Your memory is very good as to the facts you have generally stated here, is it?

A. I think so.

289 Q. As to the length—as to the time?

A. Yes, sir.

Q. Have you had any conversation with any one in reference to that pavement lately?

A. I did this morning.

Q. With whom?

A. With Mr. Thompson.

Q. Will you state what he said to you?

A. He asked me if I had torn up that pavement and put a track on it. I told him I did. He asked me then how I found it—what I had done with it. I stated to him then what I have stated to you, in substance.

Q. Did he make any suggestion to you?

A. No, sir.

Q. Was your memory aided in any way by any suggestion from Mr. Thompson?

A. No, sir.

Q. Not at all?

A. No, sir.

Q. And yet your memory, after a spell of 11 years, without any suggestion from any one, from outside source, seems to be fresh as to recollecting the time and the modus operandi of laying that pavement?

A. Yes, sir.

Q. Had you ever seen—I think you stated you had never—any of that kind of pavement?

A. I never did.

Q. Did you ever see any afterwards laid prior to the year 1871?

290 A. No; I never saw any of it laid until they were laying it here—by the blocks here, half a mile in a place, a few years ago.

Q. Is it now your impression that the pavement in 1864 was the same as has been laid by the city since?

A. I do not think this pavement was laid in '64. That I cannot tell. I do not know when it was laid.

Q. When do you think it was laid?

A. That I don't know. All I had to do with it——

Q. Never mind that. Do you think the pavement that we refer to between Kinzie and Michigan street was the same pavement as the pavement which has been—which is now being and has been laid, for some time?

A. I should think it was the same, with the exception of the shape of the block.

Q. Did you ever see that pavement constructed?

A. No, sir.

(Endorsed:) Filed May 20, 1879; John Graves, dep'y cl'k.

291 *Deposition of Hubbard Smith for def't.*—Filed May 20, 1879.

The Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell, and Eugene Robinson
vs.
The City of Detroit. } In Equity.

The testimony of Hubbard Smith, a witness produced on the part of the defendant, before me, Charles Flowers, a commissioner of the United States for the eastern district of Michigan, on the 5th day of July, 1878.

Geo. H. Lothrop appeared for the complainants and D. C. Holbrook for the defendant.

HUBBARD SMITH, being duly sworn, in answer to interrogatories proposed by Mr. Holbrook, testified as follows, to wit:

Q. What is your present business?

A. Paving.

Q. How long have you been in that business?

A. 28 years.

Q. At what place?

A. Detroit, Michigan, and throughout the state and Canada.

Q. Have you during that time taken up and replaced pavements in the city of Detroit?

A. Yes, sir.

Q. What pavements have you taken up at different times?

A. I have taken up all the different kinds—plowed them up.

292 Q. Do you remember the year you paved Atwater street?

A. I think I do; I think it was in 1852.

Q. What kind of paving did you lay?

A. Cobble stone.

Q. In laying that pavement, did you take up any other pavement?

A. Yes, sir.

Q. Will you describe the pavement?

A. At the foot of Brush street, where Brush street runs into Atwater street, where it faces the Detroit and Milwaukee depot, I took up some round wood pavement. Nearly the whole square was paved with round wood, varying from eight inches to a foot in length; underneath was beach sand.

Q. About what length and width was that piece of pavement?

A. It was the whole width of Brush street. I should think it was nearly 32 feet square.

Q. Of what wood were those blocks?

A. I did not examine them closely. I should think they were hard wood: There might have been some small pine for that matter, and might have been some cedar; I could not state positively, for I was not interested. I know it was round timber; I think there was some pine amongst it.

Q. Was it or was it not in its natural state?

A. Yes; there had never been an axe on it more than to turn it.

Q. About what was the length of the blocks?

A. I should think they varied from 8 to 12 inches. Some were worn more than the others in the roadway out of the stone yards were worn down more than they were on the side.

Q. How were they sawed off at the ends?

293 A. Square across; they looked so in taking them up; each end was alike, only where the wheels gouged them out.

Q. How were they laid on the sand?

A. The same as any round blocks, on the ends, and as close together as could be laid. I ran the plough into one, and I thought it was a stick driven into the ground; the teams could not pull it, so I took the teams away from there, and the whole square we had to take up with crow-bars and picks. The man is here that helped me plow, that used to ride the plough-beam.

Q. Can you state the depth of sand?

A. No, I cannot; but blocks such as they were would require a deeper bed of sand than we use now. They were not sawed exactly true, as we do by gauge, and if there was not sand enough some of them would go through into the clay.

Q. With what were the interstices between the blocks filled?

A. I could not say—being the first paving of that kind I saw put down—whether they were filled with broken stone or gravel; there was mud on the top when we took them up, and that is the reason we did not notice at the time.

Q. Did you notice that there was any pitch or cement used?

A. No; I did not notice that; I could not tell, the whole thing being covered with mud; it was black any way.

Q. Do you know of that kind of pavement having been laid or existing in any other part of the city?

A. No; that was the only place I came in contact with.

Q. Was there not a piece of that pavement, or one similar to it, laid on Jefferson avenue?

A. There might have been; I know after that was finished
294 and we started paving up Woodward avenue I went to Sandusky and opened a stone quarry there, and was away part of the summer; I think my brother-in-law was here; he came here in 1849; I think he would know more about it than I would; that is the only place I came in contact with.

Q. Was or was not Atwater street at that time one of the principal thoroughfares for teaming—hauling materials?

A. Yes, sir; the heaviest teams—the biggest dock—did the most business; right at the foot of that street where it was paved was the stone-yard, where we got all our curb and cross walks; we hauled immense loads of it.

Q. Do you know who laid that pavement?

A. No, sir; I do not.

Q. Did you know William Burnell?

A. Yes, sir; we bought curbing and cross-walk of him; he was the man that I understood did the paving and did some more up here in an alley.

Q. Was this in front of his yard?

A. Yes, sir; where they went into the yard; they occupied nearly the space between Brush and Beaubien streets.

Q. Do you know of any one that assisted you in plowing up that street?

A. Yes, sir; I think his name is John Smith; there were several Smiths, and we always called him Red Smith; that is the name he went by on the books.

Q What did he do?

A. He used to hold the plough for me and ride the plough; we had six horses.

Q. Do you know any other man?

295 A. No, I could not call any other one, it was so long ago.

Q. Did this pavement extend clear across the street?

A. It extended nearly the whole width of Brush street and the entire width of Atwater street. Atwater street is paved 32 feet; Brush street, I think, is 28 feet. I know Atwater street we paved 32 feet.

Q. In that space were there any square or manufactured blocks?

A. No, sir; they were all alike, only differed as to size. I noticed that in particular, for we had plowed up other places where they had put plank roads and places where we would strike broken stone and corduroy; in fact almost every thing. It looked to me where there was a bad hole they filled it in with something. These were only short spaces. This was the biggest spot of pavement and was in fact the only one I noticed.

Q. This attracted your attention particularly, did it?

A. Yes, sir; I have thought of it more since I have been in the

business and these different patents have come out. I have helped lay 12 different kinds of patent.

Q. Are you acquainted with what is known as the Phillips patent?

A. Yes, sir; I have laid about eight miles of it in this city.

Q. What was the difference between the pavement you tore up in 1852 and that known as the Phillips?

A. In the mode of laying there is no difference. Both are round timber. They might have been different kinds of material, but as to the kind of timber they are both round.

Q. The foundation the same?

A. Yes, sir; same. We have put broken stone under the Phillips, I think, two years while I was connected with paving,
296 and after that we got back on sand.

Q. What depth of sand was there on this pavement?

A. I don't say. Three or four inches. It was worn and driven a good deal out of place.

Q. As to the filling between the blocks you can't state what that was?

A. I could not state. I paid no attention to it. I know we cleaned it off and the spaces were full and pried it up with a bar so as to get it out of the way and go on plowing. They were pretty close on to us with the grading.

Q. Had you ever heard at that time of any kind of cement being used to fill up the spaces?

A. No, I don't know that I ever did. This is the first wood paving I had ever seen. I had never seen anything then but quarry stone and cobble.

Q. How many miles of cobble stone have you laid in this city, do you suppose?

A. I don't know. I have helped lay 80 or 90 miles of paving in the state of Michigan. I have laid every foot of Nicholson pavement that has been laid in the city, and a good share of cobble stone. I have been interested in either by the year or contract in all the cities in the state; help lay three or four kinds of stone on the Free, McGonegal, Ballard, Wykoff, &c.

Q. In laying the cobble-stone pavement and the Phillips pavement, what is the difference between the construction, if any, of the stone and the block?

A. The bed is made the same. One we lay to the line and the other we lay out with a board and scrape it. We roll one and smooth the other down. We fill the spaces in the cobble-stone as we
297 go along. In the Phillips the blocks are laid on the sand and the space is filled after the blocks are laid. The foundation is the same in both.

Cross-examination by Mr. LOTHROP:

Q. How long have you lived in this city?

A. I came here on the 28th of April, 1851.

Q. What was your business when you first came here?

A. I was a harness-maker by trade.

Q. How long had you been here before you got into paving?

A. I got here on the 28th, and commenced on the 29th running business with my brothers-in-law, the Frenchs; I never had seen them, but they wanted me to go to work, and I concluded it was better than the trade I was working at.

Q. What Frenchs?

A. Stanley French and James.

Q. You say when you came to this wood pavement on Atwater street you could not see it?

A. There was mud on the surface, such as accumulates on all pavement.

Q. Was the paving completely covered from sight so that it was impossible to see what it was?

A. I don't know; in plowing along the ground all looked alike; we found we could not plow it and we backed out and put in the bar.

Q. Had you been on that street before you commenced paving it?

A. Yes, sir.

Q. Had you noticed a wooden pavement there before you commenced plowing it?

A. I noticed there was a drive way to go into the stone
298 yard.

Q. Had you noticed there was a wooden pavement?

A. No, I did not know what the foundation was until we struck it.

Q. Without using the plow or something to uncover it, it could not be seen what it was?

A. No, I guess not.

Q. That pavement was a rectangular piece about 28 by 30?

A. Yes, sir.

Q. What, if any, building was on the northeast corner of Atwater and Brush streets?

A. I don't recollect; I think there might have been a bakery; I think Thompson's old hotel was on the northwest corner.

Q. What Thompson was that?

A. He is dead; he went to Port Huron and bought property there; there is a hotel up there in his name now; his wife is alive now.

Q. You don't know what was on the N. E. corner?

A. No.

Q. What was on the south side of Atwater street?

A. Burnell and Watson's stone yard; they occupied nearly all the ground between there and Beaubien street.

Q. What has become of Burnell?

A. He died two or three years ago.

Q. What has become of Watson?

A. He is dead; the children all married.

Q. Do you know where this man Smith is that helped you plow at that time?

A. He was in the city when I went away; I don't know whether he is here now or not.

Q. How did you come to remember this old pavement?

299 A. I have thought of it a good many times since I have been laying this round wood pavement.

Q. Did you say to Mr. Holbrook that you knew anything of this old pavement?

A. No, sir; I don't know how he knew anything about it from me. I mentioned it at the city hall, that I had taken up some round pavement here in 1852.

Q. Was there any sign of board foundation under this?

A. No, sir; they don't generally lay board foundation under that kind of pavement.

Q. You are certain there was no board foundation under it?

A. Yes, sir; I am confident. I plowed below there nearly a foot.

Q. Are you certain there was no cement used in it?

A. What was between the spaces I don't know. I don't know how long it had been laid. I know they were filled full of something or other; whether it was broken stone or sand I do not know.

Q. Had the blocks decayed very much?

A. Not a great deal. Some of them where the track was had worn a good deal more than the others. They had varied in length.

Q. Were they badly decayed or had kept their original shape?

A. They were round where the wheels had run across. Those on the sides were three or four inches long, not sawed all of a length.

Q. Were they in their original shape or had they decayed?

A. The original shape, and tolerably round, and I think most of them were drawn off for wood—a load or two of them.

Q. Which way did the grain run as they lay in the ground?

A. The same as in any round timber.

Q. Run the same way as a log of wood lying on the ground?

369 A. If you take a cedar post and saw it off, the grain is generally up and down. There was nothing taken off of it.

Q. Wasn't this a piece of corduroy?

A. O, no; corduroy generally runs the other way. It did when I was in California. I have ridden over a great many miles of corduroy.

Q. Do you remember the name of any other party besides Smith who was there when you plowed up this pavement?

A. I don't know. I think one of the teamsters is up at the Sault, and I do not know where the other is. I drove the plough, and there was a man on the beam, the two drivers, and myself.

Q. Who used the crowbars?

A. I and the teamster. That is the way we did business.

Q. When did you first see any of the Phillips pavement laid?

A. I think I laid the first here in 1874—no, it was not; it was before that. We put in a piece on Hastings street, one block be-

tween Franklin and Atwater street. I don't know but it was laid in 1871 or '72, and then there was a piece laid on High street.

Q. Since then you have laid a good deal?

A. Yes, sir; five or six miles.

Q. What do you consider the best form of wooden pavement?

A. The round cedar pavement and the wedge.

Q. You have been a paver ever since you paved Atwater street, in 1852, have you not?

A. Yes, sir.

Q. Did it ever occur to you that that pavement you tore up there was a good pavement?

A. No. When I saw the round wood pavement I knew it was a good pavement, for the reason that the wheels were on different
301 blocks at once, and avoided the jar as where we used the strip.

Q. You never laid any of that until you laid the Phillips pavement in 1871?

A. That was the first laid here.

Q. Was there any of this pavement such as you describe on Atwater street in '52, in any other part of the city to your knowledge?

A. Not to my knowledge.

Q. Where does this Smith live, do you know?

A. His wife is dead; he was driving a team here; I do not know whether he is here; I presume he is; he has got a son that sails and has a daughter that is married.

Q. For whom is he driving a team?

A. I could not say now; when I went away he was driving a team in the cellar where they are building the board of trade building; where he is now I don't know.

Q. You know where he lives?

A. I do not; I presume he boards with the man he is driving the team for; I think the man's name is Foley.

(Signed) HUBBARD SMITH.

Subscribed and sworn to before me this 6th day of July, A. D. 1878.

(Signed) CHARLES FLOWERS,
U. S. Commissioner, E. Dist. Mich.

Certificate of commissioner of the manner of taking, etc., of above deposition.

(Signed) GEO. H. LOTHROP,
Sol'r for Compl't.

(Endorsed:) Filed May 20, 1879; Jno. Graves, dep'y cl'k.

302 *Depositions of Sheley, Owen, Farrand, Gooderich, Chapeton, and Wilkes.*—Filed May 20, 1879.

Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Eugene Robinson & Jesse H. Farwell
vs.
The City of Detroit.
} In equity.

Testimony taken by Charles Flowers, United States commissioner, at Detroit, January 10th, 1878.

Geo. H. Lothrop appeared for the complainants; D. C. Holbrook appears for the defendant.

ALANSON SHELEY sworn for the defendant:

Question. Will you state whether you resided in the city of Detroit in the years '37 and '38, and whether you have resided here since?

Answer. Yes, sir; I have lived here 46 years.

Q. Did you know Julius Eldred?

A. I did, sir.

Q. Do you know of a wooden pavement being laid by him on Jefferson ave.?

A. I do, sir.

Q. About what year was that?

A. It was somewheres, I think, between '38 and '40; I cannot give the year exactly; I think it was before the election in 1840.

Q. Will you describe that pavement?

A. The pavement was made of pine blocks, sawed with eight corners, octagonal, out of pine logs, just as the pine logs happened to cut; they were not sawed from lumber, but from timber; just sawed off and the edges taken off, leaving eight corners.

Q. How long were the blocks?

303 A. The blocks, I should think, were about ten or twelve inches long; they might not have been quite as long as that, but I should think they were; he laid some of the blocks in front of his lumber yard; the poorer ones he put down there; the blocks were laid close together on Jefferson ave.; it was laid in front of three stores, about sixty feet, 20 feet feet each, I should think, reaching half-way over into the street; that would be about 60 feet; I guess it didn't reach quite half-way over; it may, but my impression is that it did not reach over 25 feet in the street.

Q. How were those blocks laid?

A. They were laid right on the ground, without anything under them; ends down on the ground; the place was dug out and these blocks set right in; Jefferson ave., at that time, was one of the main thoroughfares of the city, one of the promising thoroughfares, thought to be the best we would ever have here.

Q. Do you remember the Woodward ave. pavement laid on Woodward ave.?

A. Yes, sir; I can't tell exactly the year it was laid; it was between -forty and -fifty; there were two of them; the Methodist Church had one; and one below that, right opposite Buhl's corner, between Larned and Congress streets, on the east side; they used square blacks there, blocks that were sawed off square from what you might call square timber; they were not all one size; they might be 6 inches square or 4 inches square; they were rectangular blocks; I think the blocks were about 6 inches long; they were set on the ends on the ground the same as the others; I think there was sand under those; I used to look at it when I was going by, about every day; I don't know the width of it; didn't come out quite halfway into the street; it was the length of the lot they occupied
304 there. My opinion is that it was about 42 feet on the lot next to the corner. I guess it came down to the corner of Congress street; there was a large wooden building put there by Burchard, the pavement covering the whole width of the lot. The lot may have been 50 feet in width; perhaps it was. The other pavement on Woodward ave., the width I have referred to, was in front of the Methodist church; that was laid in the traveled part of the street. It was constructed in the same way as the last one described, square blocks standing on the end. I don't remember whether they put sand under those or not; I can't tell as to that, having forgotten. If I should guess about it I should think they did, because the other folks had used sand on the other side and that stood well. I think the Methodists had laid their sidewalk in the same way. I have no idea how long the pavement was used. I remember the Eldred pavement laid there about 10 years before it was torn up; the blocks got rotten and one thing and another. But I don't remember the Woodward ave. pavement. The first man who paved Jefferson ave. with cobble stone was Sam French; he was the man who first paved with cobblestone. That was 25 or 30 years ago; certainly as much as that that they commenced paving.

Q. Did that pavement on Woodward ave. remain until Woodward ave. was paved with stone?

A. No; I think it didn't exactly. I don't know but it did, too.

Q. According to your best belief how long was that pavement used on Woodward avenue?

A. I cannot tell. When French paved Jefferson ave.
305 the old blocks were torn up and they were all rotten.

Cross-examined:

Q. On this Jefferson ave. pavement were the blocks laid close together?

A. Very close.

Q. Was there any sand put between those blocks?

A. I don't think there was.

Q. Did you see the Woodward ave. pavement at the corner of Congress street in the process of construction?

A. Yes, sir.

Q. Did you pay any particular attention to it, more than to walk by there?

A. I don't know that I paid any more attention to it than any new thing. It was something we hadn't had here before and I was looking at it, wondering how it was going to work. I was in the lumber business at that time; I was very anxious they should use all the lumber they could in any way.

Q. Any circumstances connected with the laying of the pavement which lead you to believe that they put a sand foundation under the blocks?

A. No circumstances except I saw the sand thrown in on the ground. I didn't know any reason for it unless it would stand better.

Q. Were those blocks set close together?

A. Yes, sir.

Q. Any sand placed between the blocks?

A. I don't know whether there was or not; there might have been some sand thrown over when it was put down.

Q. Were they set as close together as the pavers could lay them?

306 A. They were set together about as they would go; some were 6 inches square, and some were eight. There were cracks between them more or less.

Q. The intention was to set them up close together?

A. I don't know whether they intend to leave any cracks; I don't know that they did.

Q. Were the cracks left large enough to be filled up with sand as in the wooden pavement?

A. No; there were not as large spaces left as now.

Q. Who owned the store on Jefferson ave. in front of which this pavement was laid?

A. Eldred and Russell.

Q. What was Eldred's object in laying this wooden pavement?

A. I don't know, excepting to have a good dry spot in front of his store. That was the object I thought he had.

Q. Did you hear him say whether or not he laid it to see how such pavement would work?

A. I talked with him about that kind of pavement then frequently when he was cutting up his blocks. He laid it in Jefferson ave. and Atwater street. I didn't think it would last, but he thought it would last a great many years.

Q. Did he lay this to see how such a pavement would work?

A. I don't know whether he laid it for that purpose or not. He laid it, as an experiment I guess, for the purpose of having a good, solid road in front of his store. Jefferson ave. was very muddy in the spring and fall of the year, and it was almost impossible for teams

to stand in front of any store, and Eldred wanted to have a place where teams could stand and be dry; and he said they were going to put down blocks in that way to pave his street.

307 Q. So he put those down as a kind of an experiment to see how it would go?

A. I don't know whether it was an experiment or not. I thought it was.

Q. Didn't you tell me that he put them down as a kind of an experiment?

A. I don't know what you would call an experiment. He put them down so as to have a dry road in front of his stores.

Q. You say you don't know whether there was sand under the blocks on the second piece of Woodward-ave. pavement opposite the Methodist Church.

A. No, sir.

Q. Are you positive there was sand under the piece on the corner of Congress street?

A. I am positive they used sand in front of what was called the church lot, but whether they used sand on the Methodist pavement I don't know. I am positive Eldred used no sand.

(Signed) A. SHELEY.

JOHN OWEN sworn on behalf of the defendant.

I have resided in this city since 1836. I knew Julius Eldred. I knew a pavement laid by him on Jefferson ave. between Woodward ave. and Griswold street; I cannot fix the year that it was laid; it was a great many years ago; I should think perhaps it was about 1840; I have no distinct recollection as to the year; I should judge very likely in the neighborhood of 1840. It was a block pavement; the shape of blocks I don't remember distinctly. Speaking from recollection, I should judge the blocks were about a foot and a half long, but I have no particular recollection about the size. I

308 saw them when they were torn up, in a bad condition. From recollection as they come up to my mind, I think they were a foot and a half long. As I call them to mind, they were very unlike what has been used since. My recollection is that he, Eldred, made an excavation in the street, in which to place the blocks. I know they did. They were sawed off square upon the ends.

Q. How were they set?

A. I have no recollection.

Q. Were they set on the ends?

A. Yes, sir.

Q. Close together?

A. Yes, sir.

Q. Do you remember whether there was any sand under them or not?

A. I don't remember anything about that. I remember a pavement in front of what was called the Methodist church property on

Woodward ave. near Congress street. I don't remember about its construction, beyond the fact that there was a block pavement there; the style I don't remember. As near as I can recollect, the pavement was made before we left that church; we left it in 1840. My recollection is that the pavement was there two or three years before we moved away. I don't remember the extent of the pavement,—whether it embraced the whole front of the lot or only a part. I think it also covered the sidewalk and a part of the street in front of the lot; but I don't remember whether it embraced the whole front of the lot or a part of it.

Q. Do you remember whether there was any sand used?

A. I don't remember anything about the laying of it. My
309 recollection is that there were some patches of pavement also in front of the lots south of the church lot, but I can't locate them. I don't remember how they were made.

(Signed) JOHN OWEN.

JACOB S. FARRAND sworn for defendant.

I have lived in Detroit a little over 52 years. I remember a wooden pavement on Jefferson avenue, made by Julius Eldred. That was laid before 1840; what year I can't tell you. It was laid with blocks, irregular sides, and placed on the end. The street was excavated and the blocks laid close together.

Q. What was the space covered?

A. Two or three stores; I would not determine which.

Q. How far did it extend into the street?

A. Nearly to the middle, or quite. I think the stores are just 20 feet each. I also remember a pavement on Woodward ave., in front of what was then the Methodist church. My recollection of it is much less than the other one. I seldom was over on that street at that time; but I recollect going over the pavement, and my recollection is that the blocks were of less length than the one on Jefferson ave. I could not say what the form of the blocks were. The blocks were on the end, as the others were. I have no recollection of seeing the pavement laid. I can't tell you whether there was sand in the foundation. The only part that I recollect distinctly was that in front of the Methodist church and over the sidewalk, where we used to walk on it; when the weather was wet it was uneven. I recollect it by that. I think it was not so much as on Jeffer-
310 son ave. I don't remember whether there was any sand under the foundation or not. I don't remember any other strip between that and Jefferson ave.

(Signed) J. S. FARRAND.

ICHABOD GOODRICH sworn in behalf of the defendant.

I have lived in Detroit 42 years; I knew Julius Eldred; I knew the pavement he laid on Jefferson ave.; I saw the pavement when he was putting it down and after it was put down; it was where M.

S. Smith now is, between Griswold and Woodward ave.; that made of pine blocks sawed from timber, Mr. Owen thinks about 18 inches, but I think not more than a foot or ten inches; these blocks were octagonal; sawed off round timbers and the edges taken off; I could not say what they were laid on, because I never took notice; I saw them after they were down and I saw them when they were laying them; I never noticed them, only occasionally going along; the surface, I think, was taken off, excavated before they were laid; I cannot say how far out in the street the pavement extended, but it is my impression it went about half-way, about 60 feet.

Q. Do you remember the block pavement on Woodward ave.?

A. I remember seeing them at work, but I took no notice; I was all alone in that store where Fyfe is, before that was built up, and I didn't pay but little attention to what was going on in the street; I knew there was a wooden pavement there, but I didn't know how they put it down; I remember they were at work putting down a pavement in front of the Methodist church; I saw it after it was laid; there were one or two patches that folks tried; I believe most of the folks tried a little patch in front of their stores; I could not
311 tell what kind of blocks were used in front of the Methodist church, whether they were round or square; I could not say what the extent of the pavement in front of the Methodist church was; I guess the whole width of the block, about 50 feet; extended I think half-way into the street, but it might not have been quite so much.

(Signed) I. GOODRICH.

ALEXANDER CHAPOTON sworn on behalf of the defendant.

I was born in Detroit and have lived here ever since, with the exception of one year in my boyhood; I remember a wooden pavement on Jefferson ave. laid by Julius Eldred; I have not been able to remember what year it was; it was two or three years before French came here to lay cobble.

Question. It was over 25 years ago?

Answer. It must have been more than that; French came here in '54.

Q. Do you remember what kind of pavement that was?

A. I can't remember exactly that; I know it was a wooden pavement of blocks about a foot long, and that they were not of one size; they were cut out of boom poles; the sap was taken off, which made them look as if they were octagon, but I don't think they were octagon, they were pine; the same pavement was in front of my father's store that we own now.

Q. What was the extent of that pavement laid by Eldred?

A. It extended about half-way into the street, I think in front of about five stores; the blocks were laid on end.

Q. Was there any grading or excavating done to the street?

A. I don't remember; there must have been, because they never could have got a foot block in without grading; my father owned a

store in Woodward ave, and the same kind of wood pave-
312 ment was in front of that.

Q. Describe the manner of laying it, and everything.

A. I can't tell you the manner of laying it, only I know it was laid on the end, and the blocks were a foot long, and the sap was taken off; the blocks were irregular; I have been told by a good many that they were octagon, but they never would have gone to that trouble; I remember they were cut short; I remember the blocks; there were some hauled up to my father's house; I think that was in front of five or six stores; it run across the street, opposite Young Men's Society; they used to own a lot. My father's lot was 50 feet; I think it was a 100 feet in all; my father's went to the middle of the street; I was looking over his papers, and tried to find the account—he paid for that himself—but I could not find it.

Q. Was this street excavated?

A. I could not tell you whether it was or not.

Q. Could that pavement have been laid without it?

A. No.

Q. Do you remember whether there was any sand used in the foundation?

A. I don't remember.

Q. About what year was that?

A. I could hardly tell.

Q. Over 25 years ago?

A. I think at least 30 years ago.

Q. Do you remember the pavement laid on the other side of the street from your father's at any time?

313 A. I would not be very positive about that. There was some on the same side of the street, opposite where Stoddard's handsome store is, the second lot from Larned street.

Q. Were the blocks that were used by your father sawed blocks?

A. I would not be positive; they were a foot long; they must have been sawed; cross-cut sawed.

Q. Were they sawed on the sides?

A. No.

Q. Laid close together?

A. I could not tell; they made a very nice pavement for a time; the blocks were so large they rotted in the center, and made a very rough pavement; it was inferior timber that was used.

Q. How long ago was Jefferson ave. paved with cobble stone?

A. I could not tell without referring; we have that all in the books, but I could not tell.

Q. It was 25 years ago?

A. Yes, sir; I think it was between 25 and 27; I think it was '54 that French came here.

Q. How was that pavement laid on Jefferson ave.?

A. That was graded, and sand and stone.

Q. How deep was the grade?

A. About 12 inches.

Q. What depth of sand was used?

A. In the first part of the pavement laid on the avenue it was a foot.

Q. How was the cobble stone laid?

A. They were laid with their longest end down—longest part of the cobble down—the way they always lay cobble.

314 Q. The spaces between the stone?

A. That was filled up with sand, sir.

Q. Stone laid close together?

A. Yes, sir.

Q. About what sized stone?

A. They use them all sizes, from 4 inches up to 15 inches; we have taken up stone this year, 15 inches, on Congress street.

Q. Laid close together?

A. Yes, sir; we have taken up a great deal of cobble lately in different parts of the city where they had not been disturbed; we generally found that all the paving that Sam French put down run from 6 to 10 inches deep of sand.

Q. Was the excavation and grading of the street taken out so as to conform to the shape of the pavement after it was laid; was it rounded or was it taken out more in the center than on the side?

A. Taken all alike, agreeable to the grade of the street.

Cross-examined:

Q. How long had that wood pavement on Jefferson ave. been laid, at the time Jefferson ave. was paved with cobble stone?

A. I think about 4 or 5 years; I am not very sure about that.

Q. Not more than 4 or 5 years?

A. No; I don't believe it stood more than 4 or 5 years.

Q. How long had the wood pavement on Woodward ave. been laid?

A. All laid the same year, if I remember rightly.

Q. Was Woodward ave. paved with cobble the same year Jefferson ave. was?

A. The year after.

315 Q. So that on Woodward ave. the wood pavement had been there 5 or 6 years?

A. Yes, sir; it was in a pretty good state when they took it up; it was not in very bad condition, only rotten in the center, both on Jefferson ave. and Woodward ave.; this was done for private individuals by Mr. Eldred; he went to his different friends and tried to urge it on the people, but I don't believe the city took any part in that.

Q. Then you understand this wood pavement was laid by these parties at Eldred's request as an experiment to see how it would go?

A. No; they paid for it; he tried to induce people to introduce it.

Q. Did they put it down as though they knew it was a good thing, or put it down for the purpose of trying it?

A. It cost too much I think; it cost three times as much as this

wood pavement now; I think my father paid $3 a square yard; $280 in all; which was a good deal of money for a little strip like that.

Q. You are sure these blocks on Woodward ave. were not rectangular?

A. I am not sure; they might have been; but I don't believe they were; I believe they were only taken off to take off the sap.

Q. Then all the blocks in Woodward ave. and Jefferson ave. wood pavement were dressed, were they not, after they came from the saw?

A. That I could not tell you, sir.

Q. They were not laid in the condition in which they came in the log?

A. They were cut off to a certain length.

Q. They were not laid in the same shape in which they came
316 in the log?

A. No, sir.

Q. The sides were dressed?

A. The sap was taken off; went right round the log and took the sap off; right round the log about an inch.

Q. Do you mean they were cut so as to leave them in a circular form?

A. Yes, sir; in some places they might have taken off more, they were not done with precision; would not want to testify exactly how they were cut out; but I remember the intention was to take the sap off.

Q. Weren't they cut so that they could be laid up close together?

A. No, I don't remember that they were so close as that.

Q. Do you remember when the cobble-stone pavement was laid on Woodward ave.? Did you see it laid?

A. I could not tell the year; I have seen it laid; it was a new thing here; these men were expert at it, and my business being on Woodward ave., I had occasion to see the men working; I was a hard working man myself and I wanted to see how it was done.

Q. Did you see the piece taken up to lay the cobble stone?

A. Yes, sir.

Q. Was there sand under these blocks?

A. I don't remember.

Q. There was no sand on any of the streets at the time they commenced paving with cobble; if there had been sand, you would have noticed it?

A. I suppose so.

317 Q. The probability is that there was no sand under these blocks on Woodward ave.?

A. I don't know; they could have laid them without having some sand, still I would not want to swear that there was sand there, and I don't see how they could make an even foundation on clay.

(Signed) ALEX. CHAPOTON.

DAVID WILKIE sworn in behalf of the defendants.

I am 35 years of age; for the last five years my business has been roofing and paving.

Question. Did you ever live in London, Ontario, in the Dominion of Canada?

A. I have been in it for a short time, not exactly in London.

Q. Have you lived in the province of Ontario, Canada?

A. Yes, sir.

Q. Did you know of a wooden pavement that was laid in Canada, in the city of London?

A. Yes, sir.

Q. Where was that pavement laid?

(Complainant objects on the ground that no user in a foreign country, unaccompanied by description of patent or printed specification, is material in this cause.)

A. In London, in the barracks.

Q. Will you describe that pavement?

(Same objection.)

A. I was there when they were laying several kinds of pavement; we laid oak considerably and pine there.

Q. What shaped blocks?

318 (Same objection.)

A. We laid the cedar round and round oak, I think.

Q. What sized blocks?

(Same objection.)

A. I could not say the size of the blocks, what size; round blocks of cedar and small oak was put in.

Q. Were the blocks in the natural state except being sawed off?

(Same objection.)

A. Yes, sir; we put in cedar and part of the round oak in the natural state.

Q. How long were the blocks?

(Same objection.)

A. I could not tell exactly how long the blocks were.

Q. Give some idea?

(Same objection.)

A. They were different lengths. I think some of the stables that we put probably 12 or 14 inches on, and some of them about 8. I think in some of the barracks they were put about 8 or 10 inches; in other barracks they were put a little longer.

Q. To what extent was that pavement laid there; what surface was covered and for what purpose?

(Same objectoin.)

A. I cannot tell what surface was covered. They were all through the barracks and stable floors. There was quite a large surface going right down through there.

Q. Have you any idea of the size, of the square, the length of, anything of that kind?

(Same objection.)

319 A. You can easy enough get at it; I don't know.

Q. Have you some idea of it? Tell as near as you can.

(Same objection.)

A. I cannot tell you but there was a large extent of it. Of course I was not working for myself and I can't remember the size.

Q. Was it ten feet square?

A. Oh yes, sir.

Q. Was it 100 feet square?

A. Yes, sir; more than that.

Q. For what was it used?

A. It was used for the barracks. Indeed, it was used for all the artillery barracks and I think for the veterinary barracks.

Q. For them to exercise on?

A. They were for the horses.

Q. Was there anything outside of the stables?

A. Not when I was at work there.

Q. Any upon the ground outside of the stables?

A. Not when I was at work there.

Q. Was there any afterwards, that you know of?

A. Not that I know of.

Q. What was it laid on?

A. All laid on sand; it was all on sand foundation. The gravel was taken up and they were laid on sand.

Q. Were the blocks put on the sand?

A. All put on end on the sand close together.

Q. What were the spaces between the blocks?

A. They were all put up tight together; it was all filled in with sand and gravel between.

320 Q. Anything put on top?

A. No; they were levelled off with sand and swept all off, all levelled up with sand on top.

Q. How many stables were there that had this pavement?

A. That I can't tell; there is a whole square of all that barracks.

Q. How large was the square?

A. There was a square that held all the artillery barracks. I could not exactly tell you what the size of the square was.

Q. You have some idea?

A. It must have been several hundred feet. I left there before it was all finished; I have not been there since.

Q. What year was this?

A. I can't tell you when, but you can easily tell the year of the work here; it was shortly after the Mason and Slidell affair.

Q. It was in '61, '62, 63 or '64?

A. It was in one of those years; that is as near as I can come to it. Yes, sir; it was done before the soldiers came up there.

Q. What kind of timber did you say this was?

A. I think we used cedar, oak and black ash.

Q. Just cut from the tree?

A. Yes, sir; cut off round and put in.

Q. Who else were engaged in laying that pavement besides yourself?

A. My brother was there, and Joseph Young was then working with us. When we were working there, there were only one or two that I know of. There were one or two of them gone from there. John Stubbs, Joseph Young and myself worked together on it. My brother supplied material for it. I was looking after the getting of this material delivered; I was there and working on it.

321 Cross-examination *de bene esse*, not waiving the objection to the direct examination:

Q. Is there any of this pavement outside the doors of these barracks stables?

A. Not when I was there.

Q. It was all inside the stables?

A. Yes, sir.

Q. It was all where it could only be seen by the few men who went in to take care of the horses?

A. Yes, sir; it was just laid for them to go in and take care of the horses, or those that got into the barracks yard.

Q. The court yard was not paved in this way?

A. There was no court yard.

Q. These stables were close stables, were they not?

A. When I was there at work they were not finished.

Q. They were built for close stables?

A. Yes, sir.

Q. They do not build open stables in that country, do they?

A. No.

Q. So that this pavement could not be seen by a man going into the stable, or looking through, or either?

A. No; not any that was laid while I was there.

Q. Was there anything done to these blocks after they were cross cut before they were laid?

A. No.

Q. Was the back taken off from them?

322 A. I can't remember whether the bark was taken off the cedar or not; off the oak they chopped all the rough bark; the oak was all dressed down.

Q. In what shape was the oak dressed to?

A. Just round.

Q. Was the pine and cedar dressed to a round shape or was it left with the bark on?

A. I don't remember whether the cedar was put down with the bark on or not; the pine was put in a different part of the building; I think they took the sap off.

Q. Was not the pine sawed off of parts of square timber?

A. No; all off round timber.

Q. In laying this pavement they first dug a hole in the ground to lay the blocks?

A. Yes, sir.

Q. Did you put anything in that hole before you put the blocks in?

A. Then it wanted to be graded up; it was graded up, and we put sand in it.

Q. What do you mean by wanted to be graded up?

A. Where it was dug out and had to be filled up to a certain depth to put the blocks; it was graded up with sand.

Q. Did you dig it out deeper than it needed to be?

A. There were some places that had to be graded out, and it was graded out a little too deep, and it was a little sand foundation.

Q Where did this sand come from?

A. The sand is right there, excepting filling in between them; it was right there.

Q. You graded it up by simply putting back a part of what
323 you had taken off?

A. Yes, sir.

Q. There was no sand hauled?

A. No, except for the filling up between them.

Q. What kind of sand is this soil?

A. Yellow sand; it is used for building sand.

Q. It was not this fine yellow?

A. Yes, sir; it is the same as is used for building sand there.

Q. What kind of sand was put between the blocks?

A. We drew that up from the river.

Q. Who was the contractor who laid this pavement?

A. I don't remember exactly who was the contractor for that; my brother was supplying material, and I was working for him at that time.

Q. Where did your brother cut the timber?

A. Part in the township of McGilfrey and part in Stephens.

Q. What did you cut in McGilfrey?

A. We cut cedar; supplied all the cedar.

Q. How did he deliver it, in length or cut into blocks?

A. In length.

Q. Who cut it into blocks?

A. I cannot give you the parties' names who cut it into blocks.

Q. Did your brother have anything to do with cutting it into blocks?

A. I suppose they were in partnership altogether.

Q. What was the average size or sizes?

A. The smallest size that they cut at all was four inches.

Q. What kind of a machine did they use for cutting it?

A. They used one of Prince's sawing machines.

324 Q A sort of buzz saw?

A. No; they cut it all with these kind of long saws, made for cutting cord wood.

Q. Gang circulars?

A. No; straight saw; I don't know exactly the length of the blocks; I know they were different sizes, according to the different places they were put in.

Q. Who delivered the oak to you?

A. I don't remember exactly who delivered the oak; I was there myself at the cutting of some of the oak, and they cut it right out in the woods; some of it was cut in Loda and some in London township.

Q. How large is the average size of the oak?

A. They cut all the oak when it is not large enough for ties; it was smaller than what would make ties; what would not make ties they cut into blocks for this.

Q. Was that cut by the same machine?

A. One of the same kind of machines.

Q. That had the bark dressed off from it?

A. Yes, sir.

Q. And the bark and sap were dressed off from the pine?

A. I never worked at the pine much; I think the sap was dressed off from that.

Q. Weren't the oak blocks trimmed up and smooth?

A. I think they had just the bark dressed off.

Q. Where there were knots weren't they trimmed down and smoothed?

A. I think likely the knots were.

325 Q. When the blocks were cracked weren't they sorted out and trimmed down straight?

A. No; I guess not; I guess they were all round; they had put in all pine wood blocks before; they found out pine wood didn't last; I can give you the name of the man that put that all down in iron wood.

Q. Who directed these blocks to be laid in the round form?

A. From the government.

Q. Who was the engineer that had charge of the laying?

A. I think Stubbs was his name.

Q. What was his first name?

A. I don't remember his first name.

Q. Where did he live?

A. He was in the British army.

Q. Do you know where he is now?

A. No; he was there at that time, when those soldiers were out there.

Q. He is an officer in the army?

A. Yes, sir; he is an engineer.

Q. What is the name of these barracks?

A. I forget what they called them; I think they were the London artillery barracks.

Q. Whereabouts are they?

A. They are all done away with now; they were where the fair

ground is now in London; they are right where they have got the fair ground; the new volunteer offices are all there now; they are all pulled down.

Q. How long ago were they pulled down?

A. They must have been pulled down about 4 years ago, I think.

Q. You say this pavement was laid soon after the year 1860?

326 A. It was laid between '60 and '65.

Q. Where did you first see pavement laid after that with blocks in their natural state, laid on a sand foundation?

A. In the city of Detroit.

Q. When was it?

A. I made a pattern here to show for a patent, and another man took a patent out ahead of me. I think that is about 7 years ago.

Q. Mark Flanigan took out the patent ahead of you?

A. Yes, sir.

Q. Was this pavement laid just as it is shown in Mr. Flanigan's patent?

A. No; that pave of mine was laid on sand; a little different from Mr. Flanigan's patent. I have laid it like Flanigan's patent.

Q. Was the model you made just like that shown in Flanigan's patent?

A. About as near as could be.

Q. When did you first see any of it laid after this; the block in its natural state on sand?

A. I guess about a year afterwards.

Q. In 1872?

A. I guess it must have been about '72; I don't remember. The first I ever saw was here. I laid Flanigan's here.

Q. The first you saw after that was what you laid here under the patent of Mr. Phillips?

A. I never laid any under the Phillips patent.

Q. Do you know whether this pavement in the London barracks was put down just to see how such pavement would work; put down as an experiment?

327 A. That I could not say; there was other paving done before, and when Stubbs and those engineers came out—every time a new regiment came out—they would have something new, and they ordered the old taken up and that put down.

Q. Do you know how long that pavement staid there?

A. No; I could not say. It was up when I was there about two years ago.

Q. You don't know how it worked or anything about it?

A. No; because it was all given up to the city and volunteers, and pulled up.

Redirect:

Q. Were those blocks cut square across the stick?

(All the questions on re-direct examination bearing upon the manner in which this pavement was laid and the style of blocks is ob-

jected to for the same objection as heretofore stated on the direct examination of this witness.)

A. Yes, sir; as square as they could run them; just the same as you run them through the machines used for that purpose.

Q. How long after you saw that pavement laid did you see it there?

A. After it was laid it was probably 8 or 10 months, and then I had not seen it until I went around to see it again, and when I went there two years ago it was taken up.

Q. The last time you saw it was 8 or 10 months after you laid it?

A. Yes, sir.

Q. Was this pavement open to the public?

A. Any one could go round through there and see it. The last time I went they were building all the time and there was nothing finished.

328 Q. It was all open, was it?

A. Yes, sir; you could pass the guards and get in. After you got in through the gates you had the liberty inside the barracks.

Q. It was open to the public?

A. Yes, sir; after you passed the guards through the gates.

Recross:

Q. This pavement was laid simply as a stable floor, was it?

A. Yes, sir; all those barrack floors were in that way.

Q. This pavement that you have testified to was laid *nearly* as a floor for those stables, was it not?

A. Yes, sir.

Re-redirect:

Q. How wide were those stables?

A. I guess they must have been about twenty feet.

Q. Were there rows of stables?

A. Yes, sir.

Q. Between these rows was this pavement laid?

A. No, there was the horse standing up there, and the gangways behind.

Q. That was paved?

A. Yes, sir; all paved.

Q. Now what was the width of that pavement from the horses' heads each way; where they stood and the gangway between?

A. I should judge it was about the width of this room.

Q. 35 feet?

A. No, I guess about 16 or 20 feet. I think about 8 feet from the stall and probably 8 or 12 feet behind.

Mr. LOTHROP: The gangways paved with the same pavement?

329 A. Yes, sir; the whole floor was paved.

(Signed) DAVID WILKIE.

Robert C. Phillips et al.
vs.
The City of Detroit.

The above depositions of Sheley, Owen, Farrand, Goodrich, Chapoton and Wilkie may be read in the above cause without certificate of the taking by the commissioner, and subject only to the objections made by complainants.

(Signed) D. C. HOLBROOK,
For Def't.
GEO. H. LOTHROP,
Sol'r for Compl'ts.

Detroit, February 15, 1878.

(Endorsed:) Filed May 20, 1879. Jno. Graves, dep'y cl'k.

330 *Deposition of French.*—Filed May 20, 1879.

The Circuit Court of the United States for the east. dist. of Michigan.

Robert C. Phillips et al.
vs.
The City of Detroit. } In Equity.

The deposition of JAMES FRENCH, taken on behalf of the defendant by Charles Flowers, U. S. commissioner, Sept. 26, 1878. Mr. D. C. Holbrook appearing for the defendant, Mr. Geo. H. Lothrop for the complainant.

Examined by Mr. Holbrook:

Question. I would like to have you make a statement here of the process of taking a street that was never paved and plowing it up and grading it, putting the sand in and leveling it off, and the operation of the men laying the cobblestone.

Answer. In the first place, we take a street in the rough, just as any street is; the city surveyor gives us the stakes, at the corners generally of each intersection, and we have a diagram for the crown; then we go on; in some places it wants deeper cutting and some not much of any; we have to plow and pick and get it to a true grade, just the same as it is when the street is complete by paving; it is just as necessary to have it all of uniform grade as to have the paving in that shape; our first contract here was for 10 inches of sand; we sometimes use 12 inches, and we have put in as high as 14 inches of sand; after the bed is ready we put on sand and level it down to the right grade, wheel our stone in, sort them, place the big ones at the sides, and small ones at the centre of the streets; we have practical men to pave, with what we call paving hammers, and we have to have it hoed off.

Q. You hoe it off and make it the same grade as the street?

331 A. We do not hoe it off, we use shovels to level it—take a line and draw it, and set stones so far apart and get our

sand just the shape of the street, put our stones on and pave it with a paving hammer, a hammer with a head on one end and a crooked blade on the other with which to haul up the sand; then it has to be hoed off; sometimes it has been swept, but we never swept them much—hoed off and pounded thoroughly.

Q. That is after the stone are put in?

A. Yes, sir.

Q. The pavers, in laying this pavement with their hammers, dig in the sand a place for the stone to fit?

A. Yes, sir.

Q. And the stone are placed how, in regard to their size and form?

A. As they wheel them in we sort them, have the largest stones for the sides of the streets and the smaller size for the center.

Q. The small end or large end laid down?

A. The small end generally laid down.

Q. What is about the average of stone that are used?

A. They now call for from 8 to 4 inches; our contract when we first paved was from 10 to 4; I guess we got in some that were larger.

Q. The stone being laid in places fixed for them by this stone hammer, when the stone are laid are they completely covered with sand?

A. Yes, sir.

Q. Then what process does the pavement undergo?

A. Then we take a hoe and scrape it off as clean as we possibly can, so that we can get a space of 12 to 14 feet, and then pound it.

332 Q. By what instrument are they pounded down?

A. When we first came here we pounded them with a one-man pounder, but now we are pounding with double pounders, two men, in all stone paving that has been done of late years.

Q. What effect has that upon the pavement?

A. It wedges it together, draws it down so that it can hold up teams. If it should not be pounded it would cut up very easily; the pounding causes it to be solid, the driving wedges the sand, settles it, so that it makes it firmer.

Q. It makes the surface more even?

A. Yes, sir.

Q. Have you laid such pavement as that in the city of Detroit as you have described—when did you first commence laying it?

A. In the spring of 1849.

Q. What length of streets did you pave, if you remember, in the city of Detroit?

A. That season we paved Jefferson ave. from Third street not quite to Woodward avenue; it must have been nearly a half a mile.

Q. That was cobblestone pavement?

A. Yes, sir.

Q. After that what streets did you pave?

A. Woodward avenue from Jefferson avenue up to Adams ave. I do not know just exactly how long we were about it.

Q. About half a mile of that, wasn't there?

A. Yes, sir.

Q. Do you remember what year you did that?

A. I do not.

Q. It was after '49 and up to about '50 or 53?

333 A. Yes, sir.

Q. What other streets?

A. Woodbridge, Atwater, Congress, and Larned.

Q. Has there been any cobblestone laid in the city of Detroit since 1865, a street paved entirely with cobblestone?

A. No, I think not; we have paved in the gutters some.

Q. What depth were these stones generally?

A. They would be from 4 to 10 inches.

Q. Were those stone what are called boulders?

A. We have always called them cobblestone; they were called by that name.

Q. They were not prepared?

A. No, they were laid just as we got them from the field or water.

Q. Did you break any of them?

A. Sometimes we would break a long one, crack it in two, but we never cut off a piece from the side.

Q. The intervals between the stone were filled with sand, were they not?

A. Yes, sir.

Q. Solid?

A. Yes, sir; it gets solid.

Q. The sand and the stone form a solid foundation, a mass?

A. Yes, sir.

(Signed) JAMES FRENCH.

Complainant produces and offers in evidence, and files with the examiner, a certified copy, under the seal of the patent office at Washington, of the file wrappers in the following cases:

The application of Talmadge G. Brown, assignee of Turner Cowing, for patent No. 101,590.

334 For the patent issued to Gardner Warren, number 96,062.

File wrapper on application of the patent to D. C. Colby, number 101,100.

The above papers are marked respectively Exhibits A, B, & C. Complainant objects to these certificates as incompetent and irrelevant and improperly certified.

The above deposition may be read in evidence in the above cause, subject to objection made, and the certificate of the commissioner certifying the manner, &c., of taking is waived.

GEO. H. LOTHROP,
Sol'r for Compl't.

(Endorsed:) Filed May 20, 1879. Jno. Graves, dep'y clerk.

335 *Defendants' Exhibit A.*—Filed May 20, 1879.

[65.]—Ex. A.—C. Flowers, examiner; 4, 26, 78.

Department of the Interior, United States Patent Office.

To all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the files of this office of the file wrapper in the matter of the letters patent granted Turner Cowing, ass'or to Talmadge E. Brown, dated April 5, 1870, No. 101,590, for imp't in wood pavement.

In testimony whereof I, W. H. Doolittle, acting commissioner of patents, have caused the seal of the patent office to be hereunto affixed this twenty-seventh day of March, in the year of our Lord one thousand eight hundred and seventy-eight, and of the independence of the United States the one hundred and second.

[SEAL.] (Signed) W. H. DOOLITTLE,
Acting Commissioner.

336 162.49; 1865; No. (2,358½) 101,590; Grinnell.

Turner Cowing, ass'or to Tallmadge E. Brown, of Memphis, Tennessee,

Of San Francisco,
County of San Francisco,
State of California.

Constructing wood pavement.

Rec'd .....Nov. 13, 1865.
Petition ..... " " "
Affidavit..... " " "
Specification..... " " "
2 drawings..... " " "
Model ..... " " "
1 cert. dep., $15.....Nov. 13, 1865.
Cash.
Add'l fee cert.
1 " " cash, $20; March 23, 1870.
Examined March 22d, 1870; Spear.
2 issue Grinnell, Mar. 25, '70.
3 patented April 5, 1870; 8.
Recorded vol. , page .
Circular.
J. Dennis, Associate. 1865. Dewey & Co. San Francisco, Cal.

337 1865.

Rejc. Dec. 27, 1865.
Letter Aug. 17th, 1869.
L. Nov. 25th, '69.
L. Feb. 24th, 1879.
Ex'd: F. F.,
L. J.

Improvements in wood pavement.

(Endorsed:) Filed May 20, 1879; A. Mandell, cl'k; 1865.

338 *Defendants' Exhibit B.*—Filed May 20, 1879.

[65.]—Ex. B.—B. Flowers, examiner; 4, 26, 78.

Department of the Interior, United States Patent Office.

To all to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the files of this office of the file wrapper in the matter of the letters patent granted Gardner Warren, dated October 19, 1869, No. 96,062, for "Imp'ts in laying street pavements."

In testimony whereof, I, W. H. Doolittle, acting commissioner of patents, have caused the seal of the patent office to be heretunto affixed this twenty-seventh day of March, in the year of our Lord one thousand eight hundred and seventy-eight, and of the independence of the United States the one hundred and second.

[SEAL.]

(Signed) W. H. DOOLITTLE,
Acting Commissioner.

339 1869.

No. 96,062; Hedrick; 11,399.

Gardner Warren,

Of Boston,
County of Suffolk,
State of Massachusetts.

Laying street pavements.

Rec'd.....Aug. 28, 1869.
Petition..... " " "
Affidavit..... " " "
Specification.. " " "
Drawing, } none reg'd.
Model, }
1 cert. dep., $15; Aug. 28, 1869.
Cash.
1 add'l fee cert., $20; Oct. 8, '69.
" " cash.

Examined Sept. 27, '69. B. S. Hedrick.
2 issue; H. McCormick; Sept. 28, '69.
3 patented; Oct. 19, 1869.
Recorded vol. , page .
Circular, Sept. 28, '69.
Frederick Curtis,
Boston,
Mass.
Asso. A. Pollock,
Ex'd. F. F., Pres't.
L. J. 1869.

1869.

340 (Endorsed:) Filed May 20, '79; A. Mandell, cl'k; Cox; improvement in wood pavement; 1869; 479, c.

341 *Exhibit C.*

Department of the Interior, United States Patent Office.

To all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the files of this office of the file wrapper in the matter of the letters patent granted D. C. Colby, dated March 22, 1870, No. 101,100, for improved street pavement.

In testimony whereof, I, W. H. Doolittle, acting commissioner of patents, have caused the seal of the patent office to be hereunto affixed this twenty-seventh day of March, in the year of our Lord one thousand eight hundred and seventy-eight, and of the independence of the United States the one hundred and second.

[L. S.] W. H. DOOLITTLE,
Acting Commiss'r.

342 2953. Spear.

1869.

No. 101,100.

D. C. Colby, of Washington.

County of , District of Columbia.

Street pavement.

Rec'd.....Oct. 29, 1869.
Petition..... " " "
Affidavit..... " " "
Specification... " " "
Drawing..... " " "
Model..... " " "
Cert. Dep..... " " "
Cash, $15, Oct. 29, 1869.

Add'l fee cert.
1 " " cash $20, March 11, 1870.
Examined Nov. 30, 1869. Spear.
2 issue; Grinnell; Dec. 2, 1869.
Patented March 22, 1870.
Recorded vol. , page .
Circular, Dec. 2, 1868.
Ex'd: F. F.,
L. J.

343 *Stipulation as to English patents Exhibits A, B, D, and C.*

[Filed March 30, 1881.]

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell, & Eugene Robinson
vs.
The City of Detroit.
} In equity.

It is hereby stipulated by the parties to this suit as follows:

That the defendant may read in evidence in the hearing of this cause the certified copies of the specifications and drawings from the United States patent office at Washington, of the following English patents, issued as follows:

David Stead, issued April 23, 1839; No. 8,041.
David Stead, issued May 8, 1838; No. 7,645.
Henry Austin, issued May 25, 1843; No. 9,737.
Osborne Reynolds, issued April 27, 1841; No. 8,940.

And with the same effect in the production of the originals thereof; and it is also admitted that the books containing the printed reports of such patent, specification, and drawing have been in the United States patent office at Washington for the last ten years. Such specifications and drawings are identified by the solicitors of the parties, and marked Exhibits A, B, C, D, and signed by the solicitors.

(Signed) D. C. HOLBROOK,
For def't.
GEO. H. LOTHROP,
Sol'r for Compl'ts.

November 2, 1877.

(Endorsed:) Filed March 30, 1881. A. Mandill, clerk.

344 *Stipulation as to English and American patents Exhibits E, F, G, H, I, J, K, L, and M.*—Filed March 30, 1881.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell, and Eugene Robinson
vs.
The City of Detroit.
} In equity.

It is hereby stipulated by the parties to this suit as follows:

That the defendant may read in evidence, in the hearing of this cause, the certified copies of the specifications and drawings from the United States patent office, at Washington, of the following English and American patents, issued as follows, to—

Peter Armand, le Comte de Fontainemoreau; English patent, May 15, 1844; No. 10,187.

Charles Guidet; January 12, 1869; No. 85,814.

Henry M. Stow; February 25, 1868; No. 74,862.

Gardner Warren; October 19, 1869; No. 96,062.

John Lindsay; English patent; June 14, 1825; No. 5,185.

Thomas Parkin; English patent; April 9, 1839; No. 8,026.

Thomas Wood; English patent; October 7, 1840; No. 8,567.

D. C. Colby; March 22, 1870; No. 101,100.

Tallmadge E. Brown; April 5, 1870; No. 101,590.

And with the same effect as the production of the originals thereof; and it is admitted that the books containing the printed re-
345 ports of the English patents, specifications and drawings have been in the United States patent office, at Washington, D. C., for at least ten years. Such specifications and drawings are identified by the solicitors of the parties, and marked Exhibits "E," "F," "G," "H," "I," "J," "K," "L," and "M," and signed by the solicitors.

And any insufficiency in the answer and amendments thereto of the setting up such patents, drawings, and specifications therein is waived, and the same may be taken as sufficiently set forth and described and of the books from which they are certified.

(Signed) D. C. HOLBROOK,
For Def't.
GEO. H. LOTHROP,
Sol'r for Compl't.

April 10, 1878.

346 *Stipulation as to MacCarthy patent.*—Filed March 30, 1871.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell, and Eugene Robinson
vs.
The City of Detroit.
} In equity.

It is hereby stipulated by the parties to this suit as follows.

That the defendant may read in evidence, on the hearing of this cause, a certified copy of the specifications and drawings from the United States patent office, at Washington, of the following English patent, issued to Alexander MacCarthy, of Nov. 10, 1825, No. 5,287, and with the same effect as the original thereof; and it is admitted that the books containing the printed report thereof of said patent, specifications, and drawings have been in the United States patent office, at Washington, D. C., for at least ten years. Such specifications and drawings are identified by the solicitors of the parties, and marked Exhibit No. and signed by the solicitors.

And any insufficiency in the answer and amendments thereto, of the setting up such patent, drawings, and specifications thereto, is waived, and the same may be taken as sufficiently set forth and described, and of the books from which they are certified.

(Signed) GEO. H. LOTHROP,
Sol'r for Compl'ts.

Dated June 5, 1878.

(Endorsed:) Filed March 30, 1881; A. Mandell, cl'k.

347 *Stipulation as to Manniny & Granger report.*—Filed March 30, 1881.

Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips et al.
vs.
The City of Detroit.
} In equity.

It is hereby stipulated that the defendant may read in evidence in this cause the printed case and report published in the seventh volume of the English law reports called "Manning and Granger's Report of Stead against Williams," commencing on page 818 of said volume; that said reports were printed and published and circulated in England and the United States on a law report in the year 1846, and since.

(Signed) GEO. H. LOTHROP,
Sol'r for Compl'ts.

July 16, 1878.

348 (65.)

Defendant's Exhibit Williams.—P. A. Hoyne, com'r.

Department of the Interior, United States Patent Office.

To all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the titles of this office of the specification and drawing in the matter of the application of A. F. Williams, filed June 10, 1868, for wood pavement.

In testimony whereof, I, W. H. Doolittle, acting commissioner of patents, have caused the seal of the patent office to be hereunto affixed this twentieth day of October, in the year of our Lord one thousand eight hundred and seventy-six, and of the independence of the United States the one hundred and first.

(Signed) W. H. DOOLITTLE,

349 *Acting Commissioner.*

To all whom it may concern:

Be it known that I, Henry F. Williams, of San Francisco, in the county of San Francisco and state of California, have invented certain new and useful improvements in wooden pavements, and I do hereby delare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing.

My invention consists in making a cheap wooden pavement for country roads by setting blocks of common split wood on end and filling the interstices between the blocks as hereinafter described.

I take any ordinary timber suitable for common cord wood and saw the logs into square-ended blocks of from six to ten inches in length, and split them into pieces about the size of ordinary cord wood, or I saw ordinary cord wood into blocks of equal length and about the length above mentioned. I then grade the road to the proper level (having reference to the length of the blocks to be used), and cover it with a bed of sand or pulverized earth. I then set the blocks of split wood on end upon said bed of sand or earth, as compactly as their irregular shapes will conveniently permit. I then cover the whole surface with fine gravel and work the

350 same down into the interstices between the blocks by raking or otherwise moving the gravel over the surface of the pavement, and where the spaces are large enough to admit of it, I ram the gravel down with a suitable rammer. After the gravel has been well worked into the larger spaces, I apply sand in a similar manner to fill the smaller, and I then hammer down the blocks by means of heavy beetles, as paving stones are usually hammered down. I then cover the whole surface with a coating of coal tar or other similar pitchy substance, applied hot, and finally cover this with layer of coarse sand. The foundation bed of sand or loose earth should be thoroughly wet when the blocks are put down.

The accompanying drawing shows a top view of a section of my

pavement as it appears when the blocks are first set, and before any gravel, sand, or pitch has been applied—*a* representing the ends of the blocks, and *c* the interstices between them.

Experience has shown that a wooden pavement composed of blocks set on end will not be durable unless spaces are left between the blocks and filled with gravel, sand, or some similar material, saturated with some pitchy substance. By using split blocks as described, I get the necessary spaces between the blocks for the reception of gravel, sand, and pitch, in the cheapest possible manner, and save all expense of sawing or otherwise dressing
351 the blocks into regular forms.

When the wooden paving blocks are dressed into regular shapes, spaces between the blocks have to be formed by inserting strips of plank, or by some other similar means, but in making a pavement pursuant to my invention, nothing of the kind is required.

What I claim as my invention and desire to secure by letters patent is:

A pavement made of blocks of split wood substantially as herein described.

HENRY F. WILLIAMS.

Witnesses: J. J. TREADWELL.
C. D. WHEAT.

Ex'd E. T. E.

352 [Here follows diagram marked page 352.]

353 *Exhibit F.*

[Referred to in stipulation of April 10, 1878; D. C. Holbrook, solicitor defendant; Geo. H. Lothrop, solicitor complainant.

Department of the Interior, United States Patent Office.

To all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted Charles Guidet, dated January 12th, 1869, No. 85,814, for improved stone pavement.

In testimony whereof, I, W. H. Doolittle, acting commissioner of patents, have caused the seal of the patent office to be hereunto affixed this twentieth day of October, in the year of our Lord one thousand eight hundred and seventy-six, and of the independence of the United States the one hundred and first.

[L. S.] W. H. DOOLITTLE.

354 No. 85,814.

The United States of America.

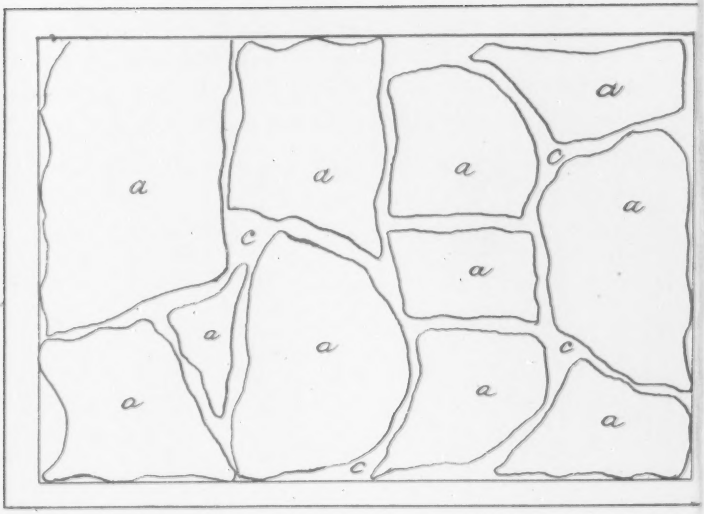
To all to whom these letters patent shall come:

Whereas, Charles Guidet, of New York, New York, has alleged that he has invented a new and useful improved stone pavement, and

H. F. Williams,

Wood Pavement,

Filed June.

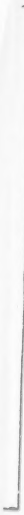


No. 345.
Phillips
v.
City of Detroit
} page 352

Witnesses.
Jo L Coombs
John D Richards

Inve
Henry J. Wil
by J. H

10 1868.



ttor

iams

oomb

attly

C. Guidet.

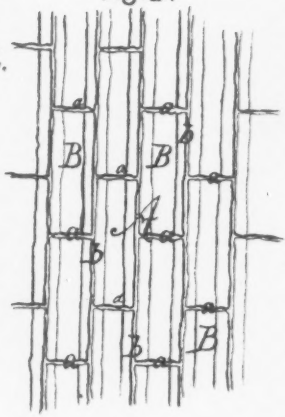
Stone Pavement.

No. 85814 Patented Jan. 12. 1869.

Fig. 1.

No. 3145
Phillips
v.
City of Detroit
Page, 256.

Fig. 2.



Witnesses:

Ernest F. Kadenbach

Phil. F. Lafond

Inventor:

Chas. Guidet

Per Van Santvoord & Hoff

Attys

has made oath that he is a citizen of the United States; that he verily believes he is the original and first inventor or discoverer of the said invention, and that the same has not, to his knowledge and belief, been previously known or used; has paid into the treasury of the United States the sum of thirty-five dollars, and presents a petition to the commissioner of patents praying that a patent may be issued therefor: These are, therefore, to grant to the said Charles Guidet, his executors, administrators or assigns, for the term of seventeen years from the twelfth day of January, one thousand eight hundred and sixty-nine, the full and exclusive right and liberty of making, using, and vending to others to be used the said invention, a description whereof is given in the annexed schedule and made a part of these presents.

In testimony whereof, I have caused these letters to be made patent, and the seal of the patent office to be hereunto affixed.

Given under my hand at the city of Washington, this
355 twelfth day of January, in the year of our Lord one thousand eight hundred and sixty-nine, and of the independence of the United States of America the ninety-third.

W. T. OTTO,
Secretary of the Interior.

[L. S.]

ELISHA FOOTE,
Commissioner of Patents.

Countersigned and sealed with the seal of the patent office.

356 [Here follows diagram marked page 356.]

357 United States Patent Office.

Charles Guidet, of New York, N. Y., Improved Stone Pavement.

Specification forming part of letters patent No. 85,814, dated January 12, 1869.

To all whom it may concern:

Be it known that I, Charles Guidet, of city, county, and state of New York, have invented a new and useful improved pavement; and I do hereby declare the following to be a clear, full, and exact description of the same, sufficient to enable others skilled in the art to which my invention appertains to fully understand and use the same, reference being had to the accompanying drawings making part of this specification, and in which—

Figure 1 represents a longitudinal section of this invention. Fig. 2 is a plan or top view thereof.

Similar letters of reference indicate corresponding parts in the two figures.

This invention relates to a pavement which is composed of stone blocks forming parallel opipeds, the narrow ends or edges of which are cut smooth, while their broad sides are cut, purposely, uneven

or rugged, the top edges of said broad sides being chamfered off in such a manner that said blocks, when put together, form close joints at their narrow ends and open joints at their broad sides, and a pavement is obtained which offers a good foot-hold for the draft-animals, and at the same time a smooth surface for the wheels passing over the same.

A represents a section of my pavement, which is composed of a series of stone blocks, B. These blocks are cut in the form of parallelopipeds, unlike the blocks used in what is known as the Russ or Belgian pavement, which are cut in the form of inverted truncated pyramids; and furthermore, the narrow edges or ends *a* of my blocks are cut smooth, while the broad sides or surfaces *b* thereof are, purposely, cut rugged or uneven, and the top edges of these broad sides are chamfered off, as shown at *c*, Fig. 1. If two inverted truncated pyramids, as used in the Russ or Belgian pavement, are placed side by side, a close joint is formed on the top surface, and the pavement thus produced offers no foot-hold to the draft-animals; but by placing a series of my blocks, B, together, as shown in Fig. 2, the joints between the smooth narrow edges *a*, which run parallel with the sides of the street, become close, while the joints formed between the broad rugged surface *b*, with the chamfered edges *c*, which joints run transversely across the street, become open, and a pavement is formed which offers a firm hold to the draft-animals, while it presents a smooth surface to the wheels passing over it. The open joints left between the rugged surface *b* of the blocks are filled with sand, and the pavement becomes perfectly firm and solid, and the single blocks are not liable to work loose.

I do not claim, broadly, as my invention, a pavement composed of blocks made in the form of parallelopipeds; but

What I do claim, and desire to secure by letters patent, is—

A pavement composed of stone blocks made in the form of parallelopipeds, having their narrow edges or ends cut smooth, and their broad sides, purposely, cut rugged or uneven, and with chamfered edges, substantially as and for the purpose described.

CHARLES GUIDET.

Witnesses:
W. HAUFF,
ERNEST F. KASTENHUBER.

358 *Exhibit G.*

[Referred to in stipulation of April 10, 1878, D. C. Holbrook, solicitor for defendants; Geo. H. Lothrop, solicitor for complainant.]

Department of the Interior, U. S. Patent Office.

To all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted Henry M. Stow, dated February 25th, 1868, No. 74,862, for improved street pavement.

In testimony whereof, I, W. H. Doolittle, acting commissioner of patents, have caused the seal of the patent office to be hereunto affixed this twentieth day of October, in the year of our Lord one thousand eight hundred and seventy-six, and of the independence of the United States the one hundred and first.

[L. S.] W. H. DOOLITTLE,
Acting Commissioner.

359 No. 74,862.

THE UNITED STATES OF AMERICA.

To all whom these letters patent shall come:

Whereas Henry M. Stow, of San Francisco, California, has alleged that he has invented a new and useful improved street pavement, and has made oath that he is a citizen of the United States; that he verily believes that he is the original and first inventor or discoverer of the said invention, and that the same hath not to his knowledge and belief been previously known or used; has paid into the treasury of the United States the sum of thirty-five dollars, and presented a petition to the commissioner of patents praying that a patent may be issued therefor—

These are therefore to grant to the said Henry M. Stow, his executors, administrators or assigns, for the term of seventeen years from the twenty-fifth day of February, one thousand eight hundred and sixty-eight, the full and exclusive right and liberty of making, using, and vending to others to be used the said invention, a description whereof is given in the annexed schedule and made a part of these presents.

360 In testimony whereof I have caused these letters to be made patent and the seal of the patent office to be hereunto affixed.

Given under my hand at the city of Washington this twenty-fifth day of February, in the year of our Lord one thousand eight hundred and sixty-eight, and of the independence of the United States of America the ninety-second.

[L. S.] W. T. OTTO,
Secretary of the Interior.

A. M. STOUT,
Acting Commissioner of Patents.

Countersigned and sealed with the seal of the patent office.

361 [Here follows diagram marked page 361.]

362 United States Patent Office.

Henry M. Stow, of San Francisco, California.—Improved Street-Pavement.

Specifications forming part of letters patent No. 74,862, dated February 25, 1868.

To all whom it concern:

Be it known, that I, Henry M. Stow, of San Francisco, in the county of San Francisco and state of California, have invented a new and useful improvement in street-pavements; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, forming part of this specification, and to the letters of reference marked thereon.

The nature of my invention consists in driving down into a foundation-bed of sand or loose earth tiers of wedge-shaped wooden blocks, with spaces between said tiers filled with gravel, as hereinafter more fully set forth.

In the accompanying drawings, figure 1 is a section of my pavement completed, shown in perspective; and figure 2 is a side elevation of a section of said pavement in process of construction.

A A, figs. 1 and 2, are wooden blocks as they stand in the completed pavement, their lower ends being made in wedge form, by leveling one side only, and said wedge-shaped ends driven down into the foundation-bed of sand or earth. B is a gravel packing between the tiers of wooden blocks. A' A', fig. 2, are similar wooden blocks, as set in process of constructing the pavement, before being driven down into the foundation-bed; and B' is a space between the tiers of blocks, to be filled with gravel, or sand and gravel. C C are removable strips to be used in constructing the pavement, but forming no part thereof when finished. These strips are placed between the tiers of paving-blocks in constructing the pavement, simply to keep said tiers a proper distance apart in straight rows, and the blocks in a true vertical position. They are made in two parts, of wedge form, lapping together, as is clearly shown in the drawings, to facilitate their withdrawal from between the tiers of blocks when the latter are driven home.

These strips may be made of wood or metal. The paving-blocks may be about three inches thick, from six to ten inches long, (or deep,) and of any desired width; but I do not limit myself to any specific dimensions. The removable strips should be about one inch thick.

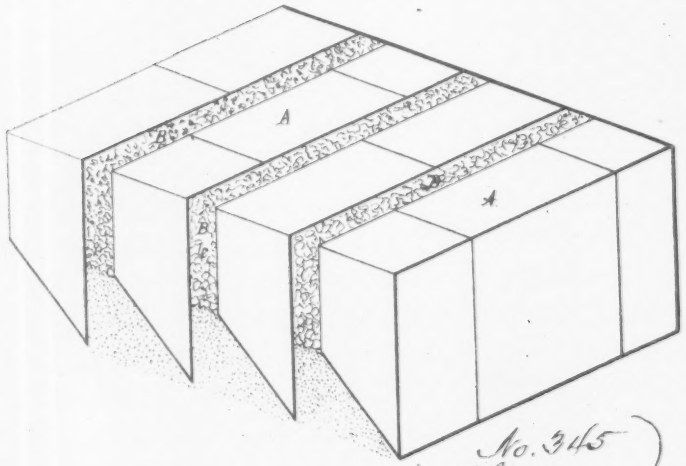
To prepare the street for the putting down of this pavement, it should first be filled with a bed of sand or loose earth, to within, say, five inches of the desired top of the pavement, (but varying according to the length of the paving-blocks to be used,) and then graded to correspond with the desired arch or crown of the pavement. The sand or earth should be thoroughly saturated with

H. M. Stow.

Street-Pavement.

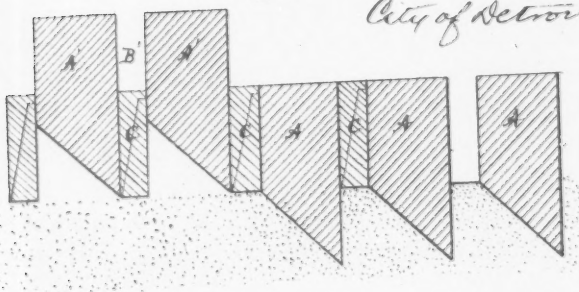
No. 74862 Patented Feb. 25, 1868.

Fig. 1.



No. 345
Phillips
v.
City of Detroit
} Pages 361

Fig. 2.



Witnesses.
Jos L Coombs
John O. Barclay

Inventor. Henry M Stow.
By J. L. Coombs
attorney

water. Then the paving-blocks, with the intervening removable strips, are placed as shown in the drawings—first, a tier of wedge-shaped blocks across the street, from curb to curb, and then a tier of strips, (which may be of any convenient length,) and so on alternately, a tier of blocks and a tier of strips, until a section of, say, ten feet or more of the pavement has been thus laid. The blocks are then driven down evenly with a heavy beetle or rammer, until a firm foundation is made by the packing of the sand or earth, effected by the wedge shape of the blocks. The section of pavement, before driving down the blocks, should be secured by proper means against spreading as the blocks are driven down. The paving-blocks are to be so constructed and set in the pavement that the grain of the wood will be vertical. When the said blocks are properly driven down, the removable strips are to be withdrawn, and the spaces between the tiers of blocks are to be filled with clean gravel the pebbles averaging, as near as may be, from one-fourth to one inch in diameter, the said gravel to be well packed by rammer and swage. Or, instead of filling said spaces with all gravel, they may be filled to within about an inch and a half of the top of the blocks with sand well packed in with rammer and swage, and the residue of the space filled with gravel, as aforesaid. When the pavement is thus completed, the whole surface should be subjected to a boiling-hot coating of coal-tar and asphaltum, or oil and asphaltum, or any other kind of suitable pitchy substance, and then covered with a thin layer of coarse sand or very fine gravel. The blocks, before being put down in the pavement, may be saturated with coal or gas tar, or any liquid hydrocarbon, or other resinous substance which will tend to preserve the wood from
363 decay. Having thus fully described my invention, with the method of carrying it into effect, what I claim as my invention, and desire to secure by letters patent, is—

A pavement composed of tiers of wedge-shaped wooden blocks, driven into a foundation-bed of sand or earth, with spaces between said piers packed with gravel, or sand and gravel, substantially as shown and described.

HENRY M. STOW.

Witnesses:
R. H. DUELL.
J. J. COOMBS.

364 *Exhibit H.*

[Referred to in stipulation of April 10, 1878. D. C. Holbrook, solicitor for defendant; Geo. H. Lothrop, solicitor for complainant.]

Department of the Interior, U. S. Patent Office.

To all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted Gardner Warren, dated October 19th, 1869, No. 96,062, for improvement in laying street

pavements. In testimony whereof I, W. H. Doolittle, acting commissioner of patents, have caused the seal of the patent office to be hereunto affixed, this twentieth day of October, in the year of our Lord one thousand eight hundred and seventy-six, and of the independence of the United States of America the one hundred and first.

[L. S.] W. H. DOOLITTLE.
Acting Commissioner.

365 No. 96,062. The United States of America.

To all to whom these letters patent shall come:

Whereas, Gardner Warren, of Boston, Massachusetts, has alleged that he has invented a new and useful improvement in laying street pavements, and has made oath that he is a citizen of the United States, *the* he verily believes he is the original and first inventor or discoverer of the said improvement, and that the same hath not, to his knowledge and belief, been previously known or used; has paid into the treasury of the United States the sum of thirty-five dollars, and presented a petition to the commissioner of patents praying that a patent may be issued therefor—

These are, therefore, to grant to the said Gardner Warren, his executors, administrators or assigns, for the term of seventeen years from the nineteenth day of October, one thousand eight hundred and sixty-nine, the full and exclusive right and liberty of making, using, and vending to others to be used, the said improvement, a description whereof is given in the annexed schedule and made a part of these presents.

366 In testimony whereof I have caused the letters to be made patent and the seal of the patent office to be hereunto affixed.

Given under my hand, at the city of Washington, this nineteenth day of October, in the year of our Lord one thousand eight hundred and sixty-nine, and of the independence of the United States of America the ninety-fourth.

W. T. OTTO,
[L. S.] *Acting Secretary of the Interior.*
SAMUEL S. FISHER,
Commissioner of Patents.

Countersigned and sealed with the seal of the patent office.

367 United States Patent Office.

Gardner Warren, of Boston, Massachusetts.—Letters Patent No. 96,062. Dated October 19, 1869.

Improvement in laying street pavements.

The schedule referred to in these letters patent and making part of the same.

To all to whom these presents shall come:

Be it known that I, Gardner Warren, of Boston, in the county

Suffolk and commonwealth of Massachusetts, have made an invention of a new and useful mode or process of laying street pavements, and do hereby declare the nature of such process and its advantages to be herein fully set forth and explained.

Heretofore, in proceeding to deposit pavements in streets, whether such pavements were iron, stone or wood, the roadway was left in the state which the soil would naturally assume upon being dumped thereupon.

In laying wooden pavements, a substratum or flooring of wood is first deposited upon the loose sand or ground, and the wooden blocks composing in the aggregate the pavement laid upon it, whether such flooring be of continuous strips or with intervening spaces.

From the fact that the body of sand or gravel, or both, has not been prepared in such manner as to be uniformly solid and compact, it not unfrequently happens that the pavement,
368 of whatever nature (but more especially in the case of wood), soon becomes more or less uneven or undulating upon its surface, thus not only requiring the exercise of much more power on the part of draught animals in drawing loads over them, but necessitating frequent repairs at considerable expense and labor.

The repairs often found necessary upon sewers, gas and water pipes, &c., require a pavement to be taken up.

In this case much time and labor are consumed in removing, and more especially in replacing, portions of the flooring of wooden pavements, as at present laid.

The motives which actuated me in conducting the experiments culminating in the process herein described have been two-fold. First, to obviate the difficulties before mentioned, and, second, to produce a wooden pavement of considerable less cost than others in use.

My process consists as follows:

The roading of the street is first brought to the proper grade, the soil used for the purpose being almost universally a mixture of sand and gravel, the latter being greatly in excess of the former.

The roadway thus prepared is then to be "puddled" with water, frequently by elevating such water to considerable height and allowing it to fall in an extended spray, or in any way by which the soil shall become thoroughly saturated, the result being a uniform, even and very solid mass, which becomes the foundation of the pavement.

An ordinary street-sprinkler would, perhaps, be the most available means of distributing water upon the road-bed.

369 Upon the foundation thus prepared the pavement is to be directly laid in any well-known manner.

Should this pavement be composed of wood, its surface is to be covered with sand and water, applied as before explained, by which means the interstices between the blocks are instantly fitted, thus avoiding the loss of time as well as additional expenditures of ani-

mal labor attendant upon the plan heretofore practised in similar cases of throwing dry sand upon the pavement, and allowing time and the travel over it to effect the proper packing of the interstices.

Although the practice of puddling sand and gravel for various purposes has long been in use, it has never, so far as my knowledge extends, been applied to the preparation of road-beds on a foundation for pavements.

Claim.

What I claim as my invention and desire to secure by letters patent of the United States, is—

The process hereinbefore explained of laying street pavements, the same consisting, in brief, of first grading the road-bed; next, puddling the mess of soil, and after depositing the pavement thereupon, packing the interstices between the blocks of the latter by means of sand and water.

(Signed) GARDNER WARREN.

Witnesses: FRED CURTIS.
EDWARD GRIFFITH.

370 *Exhibit L.*

[Referred to in stipulation of April 10, 1878; D. C. Holbrook, solicitor for defendant; Geo. H. Lothrop, solicitor for complainant.]

Department of the Interior, United States Patent Office.

To all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted D. C. Colby, dated March 22, 1870, No. 101,100, for improved street pavement.

In testimony whereof, I, W. H. Doolittle, acting commissioner of patents, have caused the seal of the patent office to be hereunto affixed this twenty-sixth day of March, in the year of our Lord one thousand eight hundred and seventy-eight, and of the independence of the United States the one hundred and second.

[L. S.] W. H. DOOLITTLE,
Acting Commissioner.

371 No. 101,100.

The United States of America.

To all to whom these letters patent shall come:

Whereas, D. C. Colby, of Washington, District of Columbia, has alleged that he has invented a new and useful improved street pavement, and has made oath that he is a citizen of the United States, that he verily believes he is the original and first inventor or discoverer of the said invention, and the same hath not, to his knowledge and belief, been previously known or used, —— has —— paid into

D. C. Colby,
Wood Pavement.

No. 101100. Patented Mar. 22. 1870.

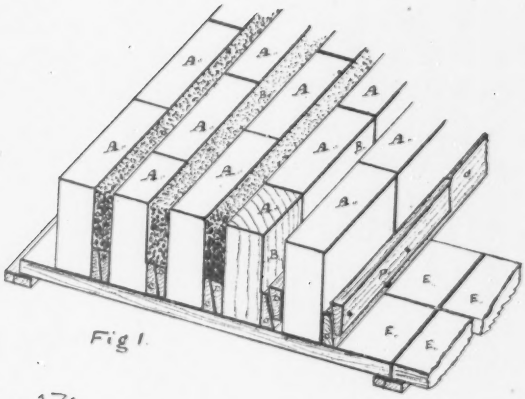


Fig 1.

No. 345
Phillips
v.
City of Detroit
} page 373.

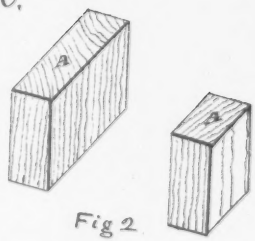


Fig 2.

Witnesses
J. F. Colby
A. Bowen

Inventor:
D. C. Colby

the treasury of the United States the sum of thirty-five dollars, and presents a petition to the commissioner of patents praying that a patent may be issued therefor—

These are, therefore, to grant to the said D. C. Colby, his executors, administrators, and assigns, for the term of seventeen years from the twenty-second day of March, one thousand eight hundred and seventy, the full and exclusive right and liberty of making, using, and vending to others to be used, the said invention, a description whereof is given in the annexed schedule and made a part of these presents.

In testimony whereof, I have caused these letters to be made
372 patent and the seal of the patent office to be hereunto affixed.

Given under my hand at the city of Washington this twenty-second day of March, in the year of our Lord one thousand eight hundred and seventy, and of the independence of the United States of America the ninety-fourth.

[L. S.]

W. T. OTTO,
Acting Sec. of the Interior.
SAM'L S. FISHER,
Commissioner of Patents.

Countersigned and sealed with the seal of the patent office.

373 [Here follows diagram marked page 373.]

374 United Stated Patent Office.

D. C. Colby, of Washington, district of Columbia—letters patent No. 101,100, dated March 22, 1870.

Improved street pavement.

The schedule referred to in these letters patent and making part of the same.

To whom it may concern:

Be it known that I, D. C. Colby, of Washington, in the county of Washington and district of Columbia, have, as I believe, invented new and useful improvements in street pavements of wood and concrete, and I do hereby declare the following to be a full and exact description of the same, reference being had to the drawings that accompany and form a part of these specifications.

Figure 1 is a perspective view of a portion of my pavement laid.

Figure 2, wooden blocks, such as are set to form the upper structure of my pavement.

Letter A, one of the full-sized blocks, having six plane sides, and its angles right-angles.

B, the space between alternate rows of the blocks, these arranged in lines crosswise the street, and the spaces corresponding.

C and D, strips of wood lying along the base of the blocks

A and at the bottom of the spaces B. The peculiar formation and arrangement of these strips will be more fully hereinafter set forth, with the reasons therefor.

E, planking, forming the substructure, which should be laid on a well-prepared bed of gravel.

F, thick plank, running crosswise beneath the abutting ends of the planks E.

The objects of my invention are to secure a block pavement that shall be very economical as to the fitting of the lumber and laying the same, and to provide with more certainty the permanent position of the blocks, although arranged in such a manner that any number of the said blocks may be readily removed and replaced, when it should become necessary to reach the street below for any purpose.

My blocks have simple plane sides, but to prevent any of the fine particles from the concrete or filling in the upper part of the spaces B from falling down and working their way beneath the blocks A, I use two strips, C and D, each varying in thickness as to its two opposite edges. Before using I slightly tack the two together, as illustrated on the right of fig. 1.

Now, having the substructure in readiness, I stand a row of blocks at the place of beginning, across the street from curb-stone to curb-stone, then take the compound strips C and D and place them in position, as illustrated on the right of fig. 1 of the drawings, a line of these extending quite across in front of the said line of blocks and resting upon the substructure E.

It will be observed that one of the strips C and D lies higher up than its fellow, and that the two sides in contact are beveling, so that, after a series of rows of the blocks A and the compound strips are laid and the filling for the spaces B above these strips is to be tamped in, the pressure thus brought to bear upon the top of D will force it down to a level with its fellow C, and the result will be to fill entirely and closely the lower part of the space B, and not only prevent all fine parts from above from falling down, but also keep the blocks more surely in place.

The blocks may be six inches or more deep, three inches or so thick, and of such width as the lumber from which they are being formed may suggest.

The spaces B, if to be filled with small sand and gravel, may well be not more than one inch wide; but if to be filled with small stones, broken stone, coarse concrete, and the like, they may be two inches or more.

We recommend to have these spaces wide and as much coarse material used in filling as can be, and still form a good, tenacious and hard concrete.

A broken stone, gravel or cement substructure may well, on firm soils, be substituted for the wooden plank E.

I do not claim using the substructure E, nor filling the spaces B with gravel, concrete or stone, as my invention consists in making

use of the two strips C and D, so formed and laid that they shall more fully fill the lower portion of the spaces B laterally when the filling above has been forced down, as hereinbefore explained.

What I claim as of my invention, and desire to secure by letters patent, is—

The two strips C and D, when used in combination with the blocks A, and formed to operate substantially as described and set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

D. C. COLBY.

Witnesses:

R. H. MARSH.

J. F. COLBY.

375 *Exhibit M.*

[Referred to in the stipulation of April 10, 1878, D. C. Holbrook, sol'r for defendant; Geo. H. Lothrop, sol'r for complainant.

Department of the Interior, United States Patent Office.

To all to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted Tallmadge E. Brown, dated April 5, 1870, No. 101,590, for improvement in wood pavement.

In testimony whereof, I, W. H. Doolittle, acting commissioner of patents, have caused the seal of the patent office to be hereunto affixed, this twenty-sixth day of March, in the year of our Lord one thousand eight hundred and seventy-eight, and of the independence of the United States the one hundred and second.

[L. S.] W. H. DOOLITTLE,
Acting Commissioner.

376 No. 101,590.

The United States of America.

To all to whom these letters patent shall come:

Whereas, Turner Cowing, of San Francisco, California, has alleged that he has invented a new and useful improvement in wood pavement, (he having assigned his right, title and interest in said improvement to Tallmadge E. Brown, of Memphis, Tenn.,) and has made oath that he is a citizen of the United States; that he verily believes he is the original and first inventor or discoverer of the said improvement, and the same hath not, to his knowledge and belief, been previously known or used; has paid into the treasury of the United States the sum of thirty-five dollars, and presented a petition to the commissioner of patents praying that a patent may be issued therefor—

These are, therefore, to grant to the said Tallmadge E. Brown, his executors, administrators, or assigns, for the term of seventeen years from the fifth day of April, one thousand eight hundred and seventy, the full and exclusive right and liberty of making, using and vending to others to be used, the said improvement, a description whereof is given in the annexed schedule, and made a
377 part of these presents.

In testimony whereof, I have caused these letters to be made patent, and the seal of the patent office to be hereunto affixed.

Given under my hand at the city of Washington, this fifth day of April; in the year of our Lord one thousand eight hundred and seventy, and of the independence of the United States of America the ninety-fourth.

W. T. OTTO,
Acting Secretary of the Interior.

[L. S.] SAM'L S. FISHER,
Commissioner of Patents.

Countersigned and sealed with the seal of the patent office.

378 [Here follows diagram marked page 378.]

379 United States Patent Office.

Turner Cowing, of San Francisco, California, assignor to Tallmadge E. Brown, of Memphis, Tennessee.—Improvement in Wood Pavement.

Specifications forming part of letters patent No. 101,500, dated April 5, 1870.

To all whom it may concern:

Be it known that I, Turner Cowing, of the city and county of San Francisco, in the state of California, have invented a new mode of constructing wood pavements for streets; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

The nature of my invention consists in providing and arranging blocks of a peculiar shape, in manner to form wedge-shaped crevices for the reception of earth or gravel, and wherein such earth and gravel will be returned to act as a key to bind and confine the blocks in their place.

Figure 1 represents a section of road paved with the blocks co m' plete. Fig. 2 represents the straight side of a block, with the inclined side at E. Fig. 3 represents the top of a block, and also the section of the base D. Fig. 4 represents the straight side of a block, which is set next to the inclined side of the adjoining block.

In fig. 1 letters A represent the top of the block; B, the side; and E the crevice and gravel. The blocks should, of course, be

T. Cowing's Improvement in Wood Pavement

No. 101590

Patented Apr. 5 1870

Fig. 1

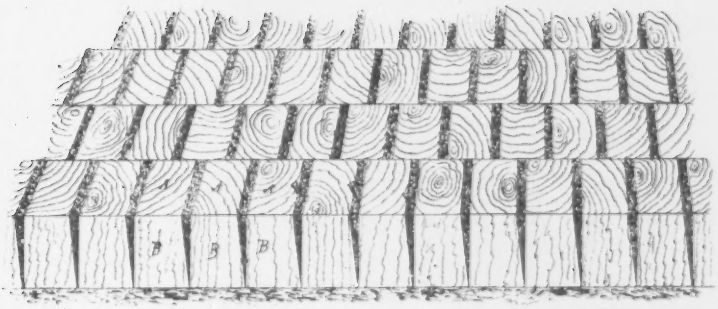


Fig. 2.

Fig. 3.

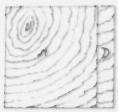


Fig. 4.

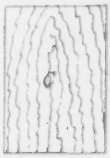


Fig. 5.

Fig. 6.

No. 365
Phillips
v.
City of Detroit
page 378

Witnesses
A. P. Dennis
Wm. H. Dennis

Inventor
Turner Cowing
By his Atty. J. Dennis Jr

placed so that the gravel spaces may extend lengthwise across the direction of the street or road, so that, besides wedging and holding the blocks securely, they may furnish a better foothold for animals drawing heavy loads.

In the drawing, the front edge of the pavement, as shown, represents the side next the curb, or a section parallel to the curb.

It is obvious that the wedge-shaped crevices may also be formed by setting the above-described blocks so that the two vertical sides and two inclined sides come together alternately, as shown in fig. 5; and it is equally obvious that two blocks having their vertical sides together may be replaced by a single block, having two inclined faces, as shown in fig. 6, without any material change of plan, and with a considerable saving of labor and expense in the construction.

To construct my pavement, prepare the roadway by grading it to proper form, and ramming solid; then set the blocks as shown in fig. 1, confining them permanently between the curbs of walks; then fill and ram the crevices with earth and gravel.

I do not claim a wood pavement composed of wedge-shaped blocks when the blocks are laid alternately on the larger and smaller ends so as to form a continuous surface of wood; but—

What I do claim, and desire to secure by letters patent of the United States, is—

A wood pavement composed of blocks, each side having a single plane surface, and one or more of the sides being inclined, and the blocks being so laid on their larger ends as to form wedge-shaped grooves or spaces to receive concrete or other suitable filling, substantially as set forth.

TURNER COWING.

Witnesses:
W. O. ANDREWS.
J. R. BRETT.

380 At a session of the circuit court of the United States for the eastern district of Michigan, continued and held pursuant to adjournment, at the district court-room, in the city of Detroit, on Tuesday, the twentieth day of May, in the year one thousand eight hundred and seventy-nine—

Present: Honorable Henry B. Brown, district judge.

Robert C. Phillips, Eugene Robinson, and Jesse H. Farwell, compl'ts,
2039] *vs.*
The City of Detroit, def't. } In Equity.

This cause now coming on to be heard upon pleadings and proofs, is argued in part by counsel for the respective parties, and continued for further hearing.

381 At a session of the circuit court of the United States for the eastern district of Michigan, continued and held pursuant to the adjournment, at the district court-room, in the city of Detroit, on Wednesday, the twenty-first day of May, in the year one thousand eight hundred and seventy-nine—

Present: Honorable Henry B. Brown, district judge.

2039] Robert C. Phillips, Eugene Robinson, and Jesse H. Farwell, complainants, *vs.* The City of Detroit, defendant. } In Equity.

This cause again coming on to be heard on pleadings and proofs, the argument of counsel are concluded, and the cause submitted for decision.

382 At a session of the circuit court of the United States for the eastern district of Michigan, continued and held pursuant to adjourment, at the district court-room, in the city of Detroit, on Wednesday, the fourth day of June, in the year one thousand eight hundred and seventy-nine—

Present: Honorable John Baxter, circuit judge, and Honorable Henry B. Brown, district judge.

2039] Robert C. Phillips, Eugene Robison, and Jesse H. Farwell, complainants, *vs.* The City of Detroit, defendant. } In Equity.

This cause having heretofore come on to be heard upon pleadings and proofs, and the same having been argued by Messrs. Lothrop & Kittridge for complainants, and by Mr. Holbrook and Mr. Bond for defendant, and the same having been duly considered, it is now by the court ordered, adjudged and decreed that the bill of complaint filed in this cause be and the same is hereby dismissed with costs to defendant.

383 *Opinion of Court.*—Filed June 28, 1881.

In the Circuit Court of the United States for the eastern district of Michigan.

Robert C. Phillips, Jesse H. Farwell & Eugene Robinson *vs.* The City of Detroit. } In equity.

Letters patent, No. 121,544, issued to Robert C. Phillips for improvements in wooden pavements, are void for the want of novelty and invention.

A pavement consisting of blocks of wood cut from the trees or branches of trees in their natural form, the bark only being re-

moved, laid vertically upon a bed of gravel or sand, which is also used as a filling to keep the blocks in position, is not patentable.

While the fact that a device is useful and has superseded others previously employed for analogous purposes, is proper to be considered, and in some cases is decisive, it does not of itself, by any means, establish the fact of patentability.

384 This is a bill in equity to obtain relief for the infringement by defendant of letters patent, No. 121,544, granted to the complainant, Phillips, for improvements in wooden pavements. The bill prayed for an injunction, an account, and an assessment of damages.

The material portions of the specifications are as follows: "My improvement consists mainly in the use of wood of any suitable kind, in its natural or undress state; that is, in the form of round blocks or sections of small trees, or the branches of trees, from which the bark has been removed, cut as nearly at right angles to their length as may be, generally in lengths of about six inches, their diameter varying from three to twelve inches. These are placed upon end upon a bed or foundation composed of a stratum or layer of broken stone about eight inches deep, upon which a course of coarse sand or gravel, or, say six inches in depth is spread, the whole properly rolled or rammed so as to be solid, and presenting an even or uniform surface for the block to rest upon. Upon this the blocks are placed upon end, as nearly together as may be, in such manner as to form an even or uniform surface. They are then rolled or rammed heavily, so as to force them well down upon the bed. The spaces or openings between the blocks are then filled with good hard coarse gravel and sand, and again rolled or rammed; after which the whole is covered with gravel or sand to the depth of about one inch, when the travel may be turned on.

"The blocks may be used as they come from the forest, or
385 they may be treated by any of the processes commonly applied to render woods hard and prevent decay, such as burnetizing, creosoting, &c.

"I do not claim broadly the use of wooden blocks in the state in which they are cut from the tree or branches, nor yet do I claim the foundation of stone or gravel, and the filling of the spaces between the blocks with sand or gravel, separately considered; but what I do claim as my invention and desire to secure by letters patent, is—

"A wooden pavement composed of blocks of any desired wood, cut out from the trunks or branches of trees or saplings, of any desired length, in their natural form, the bark only being removed, placed with their fibers vertical upon a bed of broken stone and gravel, or either of them, the spaces between the blocks being filled with gravel or sand, the whole being made compact by ramming, rolling, or other proper method, as herein shown and described."

The fact of the patent having issued and the uses of the thing patented was admitted by the answer; the defenses set up were a want of novelty and a want of invention.

The case was heard upon pleadings and proofs. Messrs. Geo. H. Lothrop & Kittridge, for complainants; Messrs. F. A. Baker, D. C. Holbrook & L. L. Bond, for defendant.

BROWN, J.—I have felt much embarrassed in the consideration of this case by the decision of Judge Emmons sustaining the validity of this patent in a suit brought by the complainant Phillips against the city of Cincinnati. Upon a motion for a preliminary in-
386 junction this decision was accepted as practically conclusive, and a writ was granted without much examination into the merits. I have hesitated whether I ought not now to treat his determination as decisive of the case upon the grounds stated by Judge Emmons himself in the Goodyear Dental Vulcanite Company *v.* Willis, 7 Official Gazette, 41. But as three most important exhibits, claimed to be in anticipation of complainant's patent, have been introduced in this case which were not before the circuit judge at Cincinnati, it is proper at least that their bearing upon the validity of the patent should be considered. It is perhaps true that if the case had been an original one I should have reached the conclusion that the patent was invalid from the disclaimer in the specification itself, but it is at least possible that the circuit judge might have reached a different conclusion in that case if these exhibits had been laid before him. It is difficult for me to determine the exact point whether the new testimony itself would authorize a different conclusion, and if the case is to be reconsidered at all I think the only satisfactory way is to consider it de novo upon the whole testimony. The magnitude of the interests involved renders it more than probable that the case will be appealed. The defendant is abundantly able to respond to any decree that can be obtained against it, and upon the whole it has seemed to me better that the record should go to the Supreme Court with a candid statement of my own views, rather than with an apology for deciding against them.

The real question in this case is not whether this patent
387 might have been valid if wooden blocks in their natural state laid vertically had never before been used, nor yet whether any of the prior patents are in terms anticipatory of this, but whether considering the state of the art in 1869, as evidenced by the various exhibits here offered, there is any invention in the result embodied in this patent. Invention has been justly described as a mental process, but it is often exceedingly difficult to draw the line between those devices which are the result of thought, ingenuity, and labor, and the products of such judgment or skill as a mechanic ordinarily makes use of in the performance of his daily work, and which are confessedly not patentable.

Great stress is laid in this case upon the superiority of this pavement over any other heretofore used, and it is claimed as almost if not quite decisive of the right of complainants to their patent. While the value and utility of a device, and the fact that it has superseded others previously employed for analogous uses, is undoubtedly en-

titled to weight in considering the question of patentability, (Smith *v.* Goodyear Dental Vulcanite Company, 93 U. S., 486,) it is after all a somewhat uncertain criterion. If the device be in fact novel, it furnishes an additional reason why the inventor should receive the reward of his ingenuity. But if it involved no exercise of the inventive faculty, its very utility is an aggravation of the wrong done by the patentee in seizing and appropriating that which properly belongs to the public. If, for example, a person should succeed in obtaining a patent for painting the names of streets upon the gas lamps it would be a very insufficient answer to the defense of non-patentability to say that it was a very useful device, and one which
388 had superseded the ancient method of painting the names upon the walls of the corner houses.

The patent under consideration is of the simplest description. It consists of blocks of wood cut from the trunk or branches of trees in their natural form, the bark only being removed, laid vertically upon a bed of gravel or sand, which is also used as a filling in to keep the blocks in position; the result is a smooth pavement of greater durability than any other wooden pavement known.

All the pavements to which my attention has been called consist of three distinct parts:

1. Superstructure of stone or wood in blocks of different shapes and sizes; sometimes, if of wood, connected by pegs or dowel pins, but oftener laid separately. In some cases the wood is treated by dipping it in tar, asphalt or other material, to keep out the water. These preparations, however, have been found to increase the tendency to dry rot, caused by the inability of the sap to escape.

2. A foundation of sand, gravel, broken stones or brick; in some instances, as in the Nicholson patent, a board is laid between the superstructure and the foundation.

3. A filling of sand or gravel, fibres of wood or concrete, sometimes mixed with tar, asphalt or pitch, and sometimes not.

For a long time it was supposed that the durability of wooden pavements was increased by saturating the blocks in tar or asphalt; but that theory seems to be now exploded, and the special excellence of the Phillips pavement is attributed to the entire omission of these preparations.

389 Comparing this pavement with the various antedating devices, we find that it differs from the cobblestone or boulder pavement only in the substitution of wood in its natural form for stone. If wooden blocks in their natural form had never before been used, undoubtedly this change would be patentable, for an entirely different result is produced; but, it being conceded that wooden blocks have been used before, and used for paving purposes, it is at least questionable whether this is not a mere change of material, and therefore falling within the rule laid down in Hotchkiss *v.* Greenwood, 11 How. 248. There is undoubtedly *another* result produced by the change of wood for stone, but it can hardly be called a *new* result, since the same result had previously been produced by the

use of like wooden blocks. The fact that cobblestones are ordinarily somewhat rounded and touch each other only at the center, and that the wooden blocks are of uniform thickness, is only saying that the natural shape of wooden blocks differs somewhat from the natural shape of cobblestone; but it does not change the fact that in both cases the blocks are laid in their natural form. I do not, however, put my decision upon this ground.

While it is true that none of the patents offered in evidence exhibit the exact combination of complainant's, there are several which approximate very closely to it; so closely that I think the variation in complainant's is a matter of judgment rather than of invention.

390 The English patent of Parkin, 1839, provides for blocks of wood of any convenient figure, with the grain either vertical or inclined, and among the drawings annexed to his patent is one showing the blocks in their natural form. The foundation is of sand, ashes, or sawdust saturated with tar or bituminous substances; the filling of sand, pulverized chalk, brickdust, or other earthy matter united with pitch or other bituminous substances or suitable cement. Practically, the only difference between his patent and complainant's consists in the saturation of the sand used for the filling and foundation with pitch, tar, or other bituminous substances.

The patent to Stead, of 1839, includes wooden blocks so shaped and placed as to support each other in a close and compact manner, always having the fibers in a vertical position: "The blocks which I use for the improved paving are cut transversely out of fir or other suitable timber, or they may be composed of deal plank ends or small portions of timber, firmly cemented together, to any other required figures hereinafter described." The foundation is to be "suitably prepared by the use of the well-known means." It seems quite clear that this would include a foundation of sand or broken stone, which has been used for such purpose from time immemorial. The spaces between the blocks may be filled with wooden pieces suited to their shape, or with cement or asphalt, or they may be left open if not too large. Figure 16 of his drawings shows a pavement of blocks in their natural form differing from complainants' only in the filling.

391 The patent to Reynolds, of 1841, describes a pavement constructed of pieces of the trunks of trees cut into suitable lengths, as from three to ten inches, and placed with their fibers vertical side by side in their natural state without being cut or hewn into any particular shapes; the interstices between these blocks are to be filled up with a compound mass of fibers of wood and concrete or asphalt; the foundation is not specifically described; this patent also differs from complainants' only in the filling.

The patent of Fontaine Moreau, of 1844, contemplates the use of blocks cut from any log of wood conforming to the shape of the trees, laid vertically upon a layer of sand and filled in with bricks,

rubber, asphalt, cement, marine glue, bituminous and other similar substances, covered by a bed or layer of sand.

All of these patents proceed upon the theory that there is some virtue in the bituminous substance used in the filling, either for the purpose of adhesion or rendering the pavement impervious to water. Complainant claims that the unadulterated sand used by him is equally efficacious as a locking for the blocks, and that the percolation of water through the sand is not injurious to the pavement. Whether there is really any such porosity in the sand as to carry off any perceptible amount of water from the surface is somewhat problematical. One of complainants' witnesses makes the pavement substantially water-tight, and says there is no difficulty in making it practically impervious to water, and thereby preserving it; while the expert, Henry, makes the preservation of the pavement de-
392 pendent upon the free circulation of the water to and from the blocks by means of the sand filling. I think it will be found in practice to make very little difference whether tar were added to the filling or not, so long as the blocks themselves are not dipped in it or otherwise saturated with it.

Granting that both elements of this patent are old, that sand unmixed with other substances is almost uniformly used as the filling and foundation of every stone pavement, and that round blocks of wood laid vertically have been used with a filling of sand mixed with asphalt, tar, or pitch, it remains to consider whether the mere omission of these bituminous substances in the filling is patentable. In the Parkin patent pitch is mentioned as the other element of the compound. In the Reynolds patent concrete or asphalt. In the Stead patent asphalt. In the Fontaine Moreau patent asphalt, cement, glue, or bitumen; but in none of them is the proportion in which these substances shall be used in any manner stated or indicated; this is left entirely to the judgment of the paver, who may use it in such quantity as to render the filling absolutely impervious to water, or may diminish it so much (as he would be likely to do if he were an economical or dishonest contractor,) as to make it of no peceptible effect. If in his judgment he may use a very small quantity, it seems to me equally a matter of judgment to omit it altogether.

It is conceded that the round block may be used in any other combination without infringing complainants' patent. The street may be graded, the blocks laid upon the solid earth, and the in-
393 terstices left open to be filled by the gradual accumulation of the street, as suggested in the Stead patent of 1839, or they may be filled with the earth scraped from the surface to make the solid roadbed, and still there is no infringement. But suppose the street itself is pure sand, as in Grand Haven, or gravel, as in Ann Arbor; would it be an infringement to do precisely the same thing? If complainants' theory be sound, then the use of round blocks which would infringe his patent in one place would not infringe it in another; and in towns where the natural substratum was sand or gravel, earth of some description would have to be imported from

taine Moreau, 15 May, 1844; No. 8940, to Osborne Reynolds, 27 April, 1841; No. 8041, to David Stead, 23d April, 1839; No. 7645, to David Stead, 8th May, 1838; No. 9737, to Henry Austin, 25th May, 1843; No. 5185, to John Lindsay, 14th June, 1825; No. 8026, to Thomas Parker, 9th Apr., 1839; No. 8657, to Thomas Wood, 7th October, 1840; No. 5287, to Alexander McCarthy, 10th November, 1825.

Detroit, 17th September, 1881.

GEO. H. LOTHROP,
Sol'r for Comp'ts.
HENRY M. DUFFIELD,
Sol'r for Def't.

(Endorsed:) Filed Sept. 17, 1881; A. Mandell, clerk.

399 *Bond on appeal.*

Know all men by these presents that we, Eugene Robinson and Jesse H. Farwell as principals, and William J. Nesbett as surety, are held and firmly bound unto the city of Detroit, a municipal corporation, in the just and full sum of five hundred dollars, to be paid to the said city of Detroit, its certain attorney, successors or assigns, for which payment well and truly to be made we hereby bind ourselves, our heirs, executors and administrators, jointly and severally, by these presents. Sealed with our seals; dated this first day of June, A. D. 1881.

The condition of this obligation is such, that whereas lately, at a session of the Circuit Court of the United States for the eastern district of Michigan, in equity, in a suit depending in said court between Robert C. Phillips, Eugene Robinson and Jesse H. Farwell, as complainants, and the city of Detroit as defendant, a final decree was rendered against said complainants, and the said complainants having obtained allowance of an appeal from said decree to the Supreme Court of the United States: Now, therefore, if the said Robert C. Phillips, Eugene Robinson and Jesse H. Farwell shall diligently prosecute their said appeal and shall pay to said city of Detroit all costs that may be awarded against them in case said decree shall be affirmed, then this obligation shall be void; otherwise to remain in full force and virtue.

400

EUGENE ROBINSON. [L. S.]
JESSE H. FARWELL. [L. S.]
WILLIAM J. NESBETT. [L. S.]

(Endorsed:) The within bond is satisfactory. June 1, 1881. (Sig') D. C. Holbrook, sol'r for def'ts; F. A. Baker, city counsellor and sol'r for def'ts. Filed in clerk's office June 1, 1881. A. Mandell, clerk.

401 EASTERN DISTRICT OF MICHIGAN, *ss.*

I, Addison Mandell, clerk of the Circuit Court of the United States for the eastern district of Michigan, do hereby certify the

above and foregoing record to be a true copy of the records, files, papers and proceedings on file and of record in said court, in the case of Robert C. Phillips, Eugene Robinson and Jesse H. Farwell, complainants, against the City of Detroit, defendant, in equity, and of the bond on appeal therefrom therein filed (except certain exhibits, being English and American patents, the originals of which are by stipulation of the solicitors for the respective parties forwarded to the clerk of the Supreme Court with this record); that I have compared the same with the originals thereof of record and on file in my office, and that the same are true copies thereof and of the whole thereof except as aforesaid, being from pages 1 to 440, inclusive, of the foregoing transcript.

In witness whereof I have hereunto set my hand and the seal of said court at Detroit this 3d day of October, A. D. 1881.

[SEAL.] ADDISON MANDELL, *Clerk.*

Transcript	$124 95
Certif	50
Cost of transmission	1 00
Approving bond to cl'k	50
	$126 95

(Endorsement on cover:) E. Michigan, C. C. U. S. No. 345. Robert C. Phillips, Eugene Robinson and Jesse H. Farwell, appellants, *vs.* The City of Detroit. Filed October 8th, 1881. 401 pages; 6 diagrams.

11—607

ADDITION TO RECORD.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1883.

No. 345.

ROBERT C. PHILLIPS, EUGENE ROBINSON, AND JESSE H. FARWELL, APPELLANTS,

vs.

THE CITY OF DETROIT.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE EASTERN DISTRICT OF MICHIGAN.

FILED MARCH 10, 1884.

ADDITION TO RECORD.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1883.

No. 345.

ROBERT C. PHILLIPS, EUGENE ROBINSON, AND JESSE H. FARWELL, APPELLANTS,

vs.

THE CITY OF DETROIT.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE EASTERN DISTRICT OF MICHIGAN.

INDEX.

	Original.	Print.
Stipulations as to patents being part of record	1	1
Exhibit A—Copy of specification and drawing in the matter of English Letters Patent, granted David Stead, No. 8041, dated April 23, 1839	2	1
B—Copy of specification and drawing in the matter of English Letters Patent granted David Stead, No. 7645, dated May 19, 1838	16	6
C—Copy of specification in the matter of English Letters Patent granted Henry Austin, No. 9737, dated May 25, 1843	24	8
D—Copy of specification and drawing in the matter of English Letters Patent granted Osborne Reynolds, No. 8940, dated April 27, 1841	38	12
E—Copy of specification and drawing in the matter of English Letters Patent granted Peter Armand LeCompte De Fontainemoreau, No. 10187, dated May 15, 1844	50	16
I—Copy of specification and drawing in the matter of English Letters Patent granted John Lindsay, No. 5185, dated June 14, 1825	82	27

	Original.	Print.
J—Copy of specification and drawing in the matter of English Letters Patent granted Thos. Parkin, No. 8026, April 9, 1829	99	51
K—Copy of specification and drawing in the matter of English Letters Patent granted Thomas Wood, Jr., No. 8657, dated Oct. 7, 1840	157	51
N—Copy of specification and drawing in the matter of English Letters Patent granted John James Alexander McCarthy, No. 5287, dated Nov. 10, 1825	166	54

1 In the Supreme Court of the United States. October Term, 1883.

ROBERT C. PHILLIPS, EUGENE ROBINSON, and JESSE H. FARWELL, Appellants,
vs.
THE CITY OF DETROIT, Appellee.
} No. 345.

The clerk of the circuit court of the United States for the eastern district of Michigan having failed to certify as part of the record in this case the copies of patents named in the stipulation at the bottom of page 195 of the printed record in this case, it is hereby stipulated and agreed that said copies of patents are a part of said record, and should have been certified as such.

Detroit, 8th March, 1884.

GEORGE GARTNER,
Sol'r for Appellants.
D. C. HOLBROOK,
Sol'r for Appellee.

2 A.

ROBERT C. PHILLIPS *et al. vs.* THE CITY OF DETROIT.

Exhibit A, referred to in stipulation of November 2, 1877.
D. C. HOLBROOK, *For Def't.*
GEO. H. LOTHROP, *For Compl't.*

Department of the Interior, United States Patent Office.

To all persons to whom these presents shall come, greeting: This is to certify that the annexed is a true copy, from the bound volumes of the library of this office of the specification and drawing in the matter of the English letters patent granted David Stead, dated April 23, 1839, No. 8041.

In testimony whereof, I, Ellis Spear, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed, this sixteenth day of July, in the year of our Lord one thousand eight hundred and seventy-seven, and of the Independence of the United States the one hundred and second.

[SEAL.]

ELLIS SPEAR,
Commissioner.

3 A. D. 1839. No. 8041.

PAVING ROADS, BRIDGES, &c.

Stead's Specification.

To all to whom these presents shall come, I, David Stead, of Great Winchester street, in the city of London, merchant, send greeting:

Whereas Her Most Excellent Majesty Queen Victoria, by her letters patent, under the great seal of Great Britain, bearing date at Westminster, the twenty-third day of April, in the second year of

her reign, did, for herself, her heirs, and successors, give and grant unto me, the said David Stead, her especial license that I, the said David Stead, my ex'ors, adm'ors, and assigns, or such others as I, the said David Stead, my ex'ors, adm'ors, and assigns, should at any time agree with, and no others, from time to time, and at all times during the term of years therein expressed, should and lawfully might make, use, exercise, and vend, within that part of Her said Majesty's United Kingdom of Great Britain and Ireland called England and Wales and the town of Berwick-upon-Tweed,
4 and also in all Her said Majesty's colonies and plantations abroad, my invention, partly a communication from a foreigner and partly my own discovery and invention, of "An improved mode or method of making or paving public streets and highways and public and private roads, paths, courts, and bridges, with timber or wooden blocks," in which said letters patent there is contained a proviso obliging me, the said David Stead, by an instrument in writing, under my hand and seal, particularly to describe and ascertain the nature of my said invention, and in what manner the same is to be performed, and to cause the same to be enrolled in Her said Majesty's high court of chancery within four months next and immediately after the date of the said recited letters patent, as in and by the same, reference being thereunto had, will more fully and at large appear.

Now, know ye, that in pursuance of the said proviso, and in compliance therewith, I, the said David Stead, do hereby declare the nature of the said invention and the manner in which the same is to be performed are fully described and ascertained by
5 the following description thereof, reference being had to the drawings and figures marked thereon, that is to say:

The invention consists in the paving and formation of the roadway of public and private ways and passages by means of wooden blocks, so shaped and placed as to support each other in a close and compact manner. The foundation being first suitably prepared to the required figure, by the usual well known means, to receive such wooden blocks, which are so disposed as to present an even and uniform surface, and always having their fibre in a vertical position, whether the roadway has a curved, inclined, or horizontal face. The blocks which I use for the improved paving are cut transverely out of fir or other suitable timber, or they may be composed of deal plank ends or small pieces of timber firmly cemented together, to any of the required figures hereinafter described, by means of asphalt or any other suitable material.

And when it is required to form a roadway upon a steep acclivity I propose to place the blocks, or to have them of such form or forms as are hereinafter described, so that channels and cavities shall be left to afford a surer footing or hold for the feet of the animals traversing over such inclinations.

6 The following is a description of the drawing annexed hereto, and which is to be considered as part of this my specification.

Figure 1 and figure 2 is a plan and elevation of a road formed

with inclined surfaces from the centre of the road, such road being mainly composed of hexagonal-shaped blocks *a*, *a*, placed with the fibre vertical against and supporting each other, the sides or parts nearest the curb-stone of such roadway being squared, made parallel, and finished to the curbstone by means of the required portions *b*, *b*, of such hexagons, as before described, and the whole keyed and made firm to the inclination of the roadway by means of the pyramidal-hexagonal wedges *c*, *c*, which are to be introduced and driven right between the hexagons forming and nearest to the centre of the road, or the roadway may be constructed without such wedges by a series of hexagons, as represented at figure 3, by cutting off the upper and under surfaces of the same to such a bevel as will correspond with the required inclination, the portions of such hexagonal blocks which are intended to be cut away are colored red in this figure.

Figures 4 and 5 represent a plan and elevation of a portion
7 of an improved paving suited to a road having a curved surface, being formed of quadrangular blocks, diminishing from their upper to their lower surfaces, and slightly spherical on the top.

Figures 6 and 7 is a plan and elevation of another kind of level roadway, formed of blocks, in shape resembling two parallelopipedons, placed transversely, although cut out from one solid piece; the upper portion of such block is so formed that the greatest width, *d*, *d*, figure 6 extends beyond the narrower width of the lower portion of the block *e*, *e*, and thereby both the upper and under part of such block provides rebates or ledges *f*, *f*, figure 7 for the adjoining block to fit under and rest upon, each making the other firm and secure.

Figures 8 and 9 represent a plan and elevation of a road constructed with improved road-blocks, resembling two hexagons. These are formed in a similar manner out of one piece to the figures last described, and have corresponding projections, both above and below, to sustain each other.

Figures 10 and 11 is a plan and elevation of another portion of the improved paving, which consists of a lower course of hexagons placed beneath and supporting an upper layer; the lower
8 hexagons *g*, *g*, being only about one-third of the depth of those which rest upon them, one fitted according to the black lines in the plan view, figure 10, and the upper hexagons represented by the red lines, figure 10 are so placed that one angle, *h*, of each rests on the centre of that immediately beneath, and thereby causes one of the upper hexagons to hold down and overlay a portion of three of those immediately beneath.

Figures 12 and 13 represent a plan and elevation of a similar kind of paving to the last described, and consists of an upper and lower course; the lower course being formed of triangular blocks placed according to the black lines in figure 12, and the upper layer of a series of parallelopipedon-shaped blocks, represented by the red lines, figure 12 laid upon them, with the fibrous or smaller end up-

wards, the upper course holding down and firmly securing the triangularly-formed base upon which it rests.

Figures 14 and 15 is a plan and perspective view of tringular-shaped blocks for forming a roadway without a lower course.

Figures 16 and 17 is a plan and end view of another kind of the improved paving, which is formed by a series of circular blocks, *i*, *i*, *i*, placed as represented in the drawing, and made parallel to the curbstone of the footway by the semicircular and quadrant pieces, *j* and *k*. The smaller interstices or cavities between such circular blocks may be either filled with wooden pieces, suited to their shape, or fitted up with cement or asphalte, as may be found convenient; and when this kind of paving is laid upon an inclined surface I should recommend the cavities to be not filled up, (provided the circular blocks are not too large, so as to render such cavities inconveniently large,) as additional hold may be thereby afforded to the feet of draught animals ascending such inclined way, as already alluded to.

Figures 18 and 19 is a plan and side view of a portion of a roadway formed by a series of octangular blocks, L, L, placed with the fibre vertical, so as to leave a square recess or interval between them, into which may be inserted a corresponding piece, *m*. When this kind of paving is laid upon a road formed upon a newly made embankment or shrinking base, I should recommend a pile to be driven into the earth through the square recess or interval of about the size and form represented by the dotted lines, figure 19, in order to support and keep the blocks firm in their position. When the octangular block paving is used for acclivities I should recommend the before-mentioned cavities either to be left unfilled or not filled up to the surface, to afford an assistance to animals ascending, the same as before described.

Figure 20 is another manner of placing an improved roadway when constructed of hexagonal blocks being placed angle to angle, instead of side to side, so as to leave triangular spaces between them if used for inclined or other roadways, which may be filled up or left partly unfilled for the purposes hereinbefore alluded to; or a series of deal ends composed of portions of a plank cut transversely, may be introduced between the hexagons, as represented, *r*, *r*, so as to leave a portion projecting above the surface to afford the hold for the feet of horses or other animals, as before stated.

Figures 21 and 22 is a plan and perspective view of a portion of another kind of roadway, formed of a series of parallelopipedon-shaped blocks, *w*, *w*, placed with the fibre vertical, and having a portion of the upper part of each side cut away, so as to form continuous longitudinal and transverse channels, extending over the whole surface of roadway in lines parallel to each other, whether the blocks be laid at right angles to each other or in a diagonal direction. These channels may be left open or so filled up with cement as to leave a slight space unfilled beneath the top surface to afford the hold to the horses' feet, as already described.

Figure 23 is perspective representation of several other kinds of

blocks suited to form a roadway. These consist of blocks of the parallelopipedon-shape, before described, or they may be cubical, having a portion of the upper part of one side cut away, as seen at *o*, or with a portion of the upper part of two sides cut away, as at *p*, *p* and *q*, *q*, or with the undersides cut away either horizontally or obliquely, as seen at *r*, *r*, all of which blocks are so contrived that they adjust and correspond to each other, and may be used wholly to construct a roadway, or with advantage to close and key up parallel to the curbstone, when the greater portion of a roadway is formed by any of the other shapes herein set forth and described.

12 Figures 24 and 35 are perspective and plan views of several oblong road blocks of different forms, which have one or more sides formed by angles or curves, and which sides fit into corresponding angular or curved cavities, as seen at *s*, *s*, or only one side may be angular or curved, and the other side or sides have horizontal or oblique projections formed, as seen at *t*, *t*, corresponding with and fitting each other, and all of which are so constructed as to easily fit and combine into a whole surface, or a portion only of any of the forms may be used and adapted to finish the sides of a road, as hereinbefore set forth and described.

Having now fully described the nature of the said invention, and the manner in which the same is to be carried into effect, I wish it to be understood that I claim as the invention the formation of a road inclined from the centre to the sides thereof, constructed by hexagons, and keyed at the highest part thereof by the half pyramidial hexagonal wedges, as represented at Figures 1 and 2, and I wish it to be understood that although I only mention the polygonal

13 figure known as a hexagon, yet I do not mean to confine myself to that precise form, as any other polygonal-shaped block may be used, and come within the principle of the invention for the purpose herein described.

I also claim the construction of a roadway by polygonal or rhomboidal-shaped blocks, as represented at Figure 3.

I also claim the formation of a public or private road or passageway by means of the upper and lower courses of blocks, as shown at Figures 10, 11, 12, and 13, whether formed by polygonal-shaped blocks, or blocks resembling cubes, parallelopipedons, triangles, or rhomboids, or of other forms.

I also claim the road blocks represented in Figures 23, 24, and 25, having angular or curved sides, or angular and concave sides, or having horizontal or oblique projections, or both united in one block, whether for the purpose of forming an entire road or finishing and squaring up a road parallel to the curbstone, when such road is formed of blocks of different shapes.

I also claim the formation of a road by means of blocks, as represented at Figures 21 and 22, with a portion of the upper sides

14 so cut away as to form cavities, for the purposes hereinbefore described, whether such blocks are parallelopipedons, cubes, or polygons.

I also claim the formation of a roadway by means of such blocks as I have described and set forth in Figures 6, 7, 8, and 9.

In witness whereof I, the said David Stead, have hereunto set my hand and seal this twenty-third day of August, in the year of our Lord one thousand eight hundrd and thirty-nine.

D. STEAD. [L. S.]

And be it remembered, that on the twenty-third day of August, in the year of our Lord 1839, the aforesaid David Stead came before our said Lady the Queen, in her chancery, and acknowledged the specification aforesaid, and all and everything herein contained and specified in form above written. And also the specification aforesaid was stamped according to the tenor of the statute made for that purpose.

Inrolled the twenty-third day of August, in the year of our Lord one thousand eight hundred an thirty-nine.

[SEAL.] BROUGHAM.

Ex'm'd E. A. M., *L. J.*

(Here follows diagram marked page 15.)

16 B.

ROBERT C. PHILLIPS *et al. vs.* THE CITY OF DETROIT.

Exhibit B, referred to in stipulation of Nov. 2, 1877.

D. C. HOLBROOK, *for Def't.*
GEO. H. LOTHROP, *for Compl't.*

Department of the Interior, U. S. Patent Office.

To all persons to whom these presents shall come greeting:

This is to certify that the annexed is a true copy from the bound volumes of the library of this office of the specification and drawing in the matter of English letters-patent granted David Stead, dated May 19th, 1838, No. 7645.

In testimony whereof, I, W. H. Doolittle, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this twentieth day of October, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundred and first.

[SEAL.] W. H. DOOLITTLE,
Acting Commissioner.

17 *Stead's Specification.*

To all to whom these presents shall come. I, David Stead, of Great Winchester street, in the city of London, merchant, send greeting:

Whereas, her present Most Excellent Majesty, Queen Victory, by her letters patent under the great seal of Great Britain, bearing date at Westminster, the nineteenth day of May, in the first year of her reign, did, for herself, her heirs and successors, give and

grant unto me, the said David Stead, her especial license, full power, sole privilege, and authority that I, the said David Stead, my ex'ors, adm'ors, and assigns, or such others as I, the said David Stead, my ex'or, adm'ors, or assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term of years therein expressed, should, and lawfully might make, use, exercise, and vend within England, Wales, and the town
18 of Berwick-upon-Tweed the invention of making or paving public streets and highways, and public and private roads, courts, and bridges, with timber or wooden blocks, communicated to me by a certain foreigner residing abroad, in which said letters patent is contained a proviso that I, the said David Stead, shall cause a particular description of the nature of the said invention, and in what manner the same is to be performed, to be inrolled in her said Majesty's High Court of Chancery within six calendar months next and immediately after the date of the said in part recited letters patent, as in and by the same, reference being thereunto had, will more fully and at large apper.

Now know ye, that in compliance with the said proviso, I, the said David Stead, do hereby beclare the nature of the said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof,
19 reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon, (that is to say):

The invention consists of a mode of paving by means of wooden blocks, cut or formed of similar sizes or dimensions; and in order to give the best information in my power, I will proceed to describe the drawing annexed, which represents part of a road or other similar surface laid down with blocks of wood of a sexagonal figure, which figure at once offers the advantage of going together, and also that the lines of junction proceed in varied directions, by which the blocks of wood will sustain each other more securely than if formed of any other figure. I do not, however, confine my claim to sexagonal blocks, as triangular or square blocks placed diagonally may be used with advantage; and in order further to secure the blocks from sinking or getting displaced, I employ dowels or
20 pins to each block, as is shown in the drawing, though I do not consider this requisite in all cases. The blocks of wood are to be placed on the earth, or formed with the grain of the wood in a vertical position; and in applying such blocks as a paving, the surface of the road or other such way is to be prepared in as solid a condition as possible, and to the figure or intended slopes, and the blocks are successively to be applied, having sand or other fine filling, driving each block up to those against which it is to rest, having first introduced the dowels or pins, which I prefer to be of oak. And it should be stated, that the wood I make use of should be of a hard and solid texture, such as oak, pine, beech, &c., and that the size of the blocks I prefer for public roads and streets, about seven to ten inches diameter at top, slightly dimishing to the base, and about nine to twelve inches in height. And I prefer that the wood employed should be first boiled in tar or saturated

21 by other suitable material, acting as a preservative to the wood; and it will be found advantageous to fill up the interstices between the blocks of wood with melted pitch, or pitch and sand or earth combined, though this is not essential, and I make no claim for such using of pitch and sand or earth.

In witness whereof, I, the said David Stead, have hereunto set my hand and seal this nineteenth day of November, in the year of our Lord one thousand eight hundred and thirty-eight.

DAVID STEAD. [L. S.]

And be it remembered, that on the nineteenth day of November, in the year of our Lord 1838, the aforesaid David Stead came before our said Lady, the Queen, in her chancery, and acknowledged the specification aforesaid, and all and everything therein contained and specified, in form above written; and also the specification
22 aforesaid was stamped according to the tenor of the statute made for that purpose.

Inrolled the nineteenth day of November, in the year of our Lord one thousand eight hundred and thirty-eight.

Ex.—J. A. W. ADAM.

(Here follows diagram marked page 23.)

24 C.

ROBERT C. PHILLIPS *et al. vs.* THE CITY OF DETROIT.

Exhibit C referred to on stipulation of November 2, 1877.

D. C. HOLBROOK,
Solr. for Def't.
GEO. D. LOTHROP,
For Compt's.

Department of the Interior, United States Patent Office.

To all persons to whom these presents shall come, greeting: This is to certify that the annexed is a true copy from the bound volumes of the library of this office, of the specification, in matter of the English letters patent, granted Henry Austin, dated May 25, 1843, No. 9737.

In testimony whereof, I, W. H. Doolittle, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed, this third day of August, in the year of our Lord one thousand eight hundred and seventy-seven, and of the Independence of the United States the one-hundred and second.

[SEAL.] W. H. DOOLITTLE,
Acting Commissioner.

25 A. D. 1843. No. 9737.

Wood Pavements, Flooring, and Veneers.

Austin's Specification.

To all whom these presents shall come: I, Henry Austin, of No.

87 Hatton Garden, in the county of Middlesex, civil engineer, send greeting.

Whereas, Her present Most Excellent Majesty hath granted unto me her letters patent, bearing date at Westminster, the twenty-fifth day of May, in the sixth year of her reign, for making, using, exercising, and vending, within that part of the United Kingdom of Great Britain and Ireland called England, Her Dominion of Wales, and Town of Berwick-upon-Tweed, and also within all her majesty's colonies and plantations abroad my invention of "improvments in wood pavements, floorings, and venurs," subject to the usual proviso, obliging me to particularly describe and ascertain the nature of my said invention, and in what manner the same is to be performed, by an instrument in writing under my hand and
26 seal, and to cause the same to be enrolled in the high court of chancery within six calendar months next after the date of the said letters patent.

Now know ye, that in compliance with the said proviso, I, the said Henry Austin, do hereby describe and ascertain the nature of my said invention, and in what manner the same is to be performed as follows, (that is to say):

"The nature of my invention consists in glueing or cementing, in the manner after described, blocks of wood, cut and placed, as after described, on to planks or slabs, or other pieces of wood, or on to stone, slate, or iron, for wood pavements," and in glueing or cementing in like manner, as after described, veneers or surfaces of wood for floorings and other building purposes, cut and placed, as after mentioned, on to wood, metal, slate, stone, cement, tile, or any other suitable substance. The wood, stone, slate, or iron, on which I glue or cement the blocks for pavements, I denominate the bed or foundation of the blocks. The
27 wood for the blocks and veneers or surfaces is to be cut at a right angle, or any considerable angle less than that to the fibre or grain of the wood. The bed or foundation, when of wood, of the pavement blocks is to be placed or laid down on the earth or road with the fibre or grain of this wood running horizontally; and any wood on which the veneers for floorings or other building purposes are to be laid or fixed, as after mentioned, must in a similar manner run in the opposite direction or angle to the fibre or grain of the veneer.

To make my wood pavement with wood foundations for roads, I take any suitable number of planks or slabs, or pieces of wood of convenient size and thickness, for the foundation, and this foundation is to be glued, cemented, keyed, pinned, or otherwise fastened together in compartments, upon which foundations I glue or cement the wooden blocks, of any convenient shape and size, without any fastening or connection together of the blocks, and
28 with intervals or spaces between them to the entire depth of the blocks. These intervals or spaces may be of the width of an inch and a half, or thereabouts, and are to be filled in with broken stone, refuse or broken slate, grit, gravel, sand, or any hard or any fibrous substances, this filling in being cemented or concreted to-

gether with liquid lime or cement poured in, or with pitch or lac and caoutchouc dissolved in naptha, melted and poured in, or with any other adhesive liquid materials. The pavement thus formed will present a constant secure footing, and avoid that slipperiness which is prevalent in other wood pavements when worn; and the great advantage which will be found in this mode of pavement is, that the footing, in its wear, will keep pace with the wear of the blocks, and still present the same secure foothold. The compartments are to be strengthened by means of ledges, glued or otherwise secured across them underneath; and for the purpose of securing the whole paving together, when wood is the foundation, the compartments should fit into each other or be glued, nailed, or screwed, or otherwise fastened on to separate pieces of timber laid underneath. They may also be tied down, where necessary, by means of iron ties, or in any other convenient mode. If the blocks be square or oblong the ends may be laid together without the intervals or spaces between the ends, but forming parallel lines and intervals in the lengths only, to be filled in as herein described. When the foundation is stone, slate, or iron, the blocks are to be glued or cemented on to such foundations in like manner as on to wood foundations, and the pieces or slabs are then to be laid down and embedded on the earth or road. The method of making foot pavements is precisely similar to road pavements, except that I prefer not to leave intervals between the blocks, and the materials used may be of lighter substance and the blocks of less depth than for carriage roads.

To make my floorings I cut in the same manner, in respect of the angle as to the fibre, as before described with respect to the blocks for pavements, the wood to form the veneers or surfaces of the floors, this wood being properly prepared and seasoned, and cut thin in the nature of a veneer. This I call my surface veneer, and I prefer for most purposes for this surface veneer the thickness of about a quarter of an inch; but I use other thicknesses, as circumstances may require. I glue or cement this veneer on to the floor boards, or other materials composing the floor, in a similar manner, as before described with respect to the glueing or cementing of the blocks for pavements on to their foundations. This, then, forms the surface of the flooring. It will sometimes be convenient first to form and lay the veneer on a thin bedding or foundation of planking instead of the immediate floor in compartments, to be nailed, screwed, glued, or otherwise fastened on to the floor, the veneer being glued or cemented on to this thin bedding or foundation of planking in the mode described where it is to be glued or cemented on to the floor boards or flooring direct.

For ornamental floors I use various colored woods, natural or artificial, and after the wood has been cut into the required thicknesses for the surface veneer, I, for the most part, stamp or cut the pieces into any forms desired by means of stamps or cutters; but sometimes the pieces of wood for the veneers are shaped by suitable planes to the forms required throughout their length, and are then cut across with fine saws of the thicknesses required. If the pat-

tern consists of very small parts the pieces of wood to form it I glue together in lengths, and I then cut the piece so formed into lengths across with fine saws into the required thicknesses as veneers, and with the veneers so cut I form different patterns by arranging and glueing or cementing them as veneers, according to the pattern, on to the flooring boards, or other floors or bedding as already described, and in the operation of glueing I apply pressure to the parts by any convenient means, in order to obtain as close a joint as practicable. When the work will admit, I glue the surface veneer on to the floor or bedding, as the case may be, as above described, in as large pieces or sections as practicable; and in order to guard against or avoid warping from damp or heat, which might occur, and at the same time to produce more decidedly the effect or resemblance of mosaic work, I divide these large pieces or sections, after they are glued to the floor or bedding, as described, into smaller parts, either by stamping them or by cutting them through in opposite directions by a series of fine saws; I then fill up the spaces or joints which will be thus formed with glue or suitable cement. The surface veneer prepared in manner hereinbefore described, I lay or fix in the required position upon, and so as to form the surface of the flooring with glue or cement, as above described, where there is no intermediate bedding, as above mentioned; and where there is such a bedding, then, by fastening that by nails, screws, glue, or other suitable means on to the floor boards or floor. The surface veneer being laid and fixed, should be plained and scraped, or rubbed to an even surface, and polished, if required, by sand or glass-paper or by other desirable means.

32

33

My method of veneering and preparing veneers for other building purposes than floorings, and which I use for staircases, wainscoating, ceilings, and other building purposes, is precisely similar to my flooring above described. For joining my wood pavements together, and my surface veneers to any foundation except wood, I prefer to make use of glue composed of crude naphtha, caoutchouc, and lac, boiled together until perfectly amalgamated, and to be used in a heated state; and the proportions of these materials may be two ounces of caoutchouc dissolved in one gallon of crude naphtha, and three times the quantity of those two articles by weight of lac. The glue I prefer to make use of for my flooring and other veneers where wood is the foundation, is composed of one part of isinglass and two parts of shellac, boiled together in alcohol until perfectly amalgamated, and to be used in a heated state; but for either of these purposes any glues sufficiently strong, and not so affected by moisture or such a degree of heat as to injure the joints, would effect the object.

34

I have described the method to be pursued with my improvements in wood pavements, floorings and veneers, which is most simple, in my apprehension, though it must be evident that there are other ways of effecting some of the details pointed out. I am aware that small pieces of wood cut in some such way as to resemble what is before described have been at times applied in the manu-

facture of small ornamental furniture and fancy articles, and I do not claim this; but I do claim as my invention—

First. The glueing or cementing of wood, cut at such angle
35 as to its fibre, as before described, on to planks or slabs or other pieces of wood, or on to stone, slate, or iron, for wood pavements; or on to wood, metal, slate, stone, cement, tile, or any other suitable substance, for the purposes of veneers for flooring and other building purposes.

Second. The securing of wood paving blocks on to planks or slabs or other pieces of wood, or on to stone, slate, or iron, without any fastening to each other, with intervals or spaces between the blocks, except at the ends where the blocks are square or oblong, as before described, and the intervals to be filled in in the manner hereinbefore described.

Third. The application of such veneers, as hereinbefore described, to flooring and other building purposes.

And such my said invention being, to the best of my knowledge and belief, entirely new, and never before used for the same purpose or purposes within that part of Her said Majesty's United Kingdom of Great Britain and Ireland, called England, Her said Dominion of Wales, or town of Berwick-upon-Tweed, or in
36 Her said Majesty's colonies or plantations abroad, and I do hereby declare this to be my specification of the same, and that I do verely believe this my said specification doth comply in all respects fully and without reserve or disguise with the proviso in the said hereinbefore in part recited letters patent contained, wherefore I hereby claim to maintain the exclusive right and privilege of or to my said invention.

In witness whereof, I have hereunto set my hand and seal, this twenty-fifth day of November, in the year of our Lord one thousand eight hundred and forty-three.

HENRY AUSTIN. [L. S.]

And be it remembered that on the twenty-fifth day of November, in the year of our Lord 1843, the aforesaid Henry Austin came before our said Lady the Queen, in her chancery, and acknowledged the specification aforesaid, and all and everything therein contained and specified in form above written, and also the specification
37 aforesaid was stamped according to the tenor of the statute made for that purpose.

Enrolled the twenty-fifth day of November, in the year of our Lord one thousand eight hundred and forty-three.

LYNCH.

Ex'd E. A. M., *E. H. K.*

38

D.

ROBERT C. PHILLIPS *et al. vs.* THE CITY OF DETROIT.

Exhibit D, referred to in stipulation of Nov'r 2, 1877.

D. C. HOLLBROOK, *Sol. for Def't.*

GEO. H. LOTHROP, *For Compl'ts*

Department of the Interior, U. S. Patent Office.

To all persons to whom these presents shall come, greeting: This is to certify that the annexed is a true copy from the bound volumes of the library of this office of the specification and drawing in the matter of English letters patent granted Osborne Reynolds, dated April 27, 1841, No. 8940.

In testimony whereof, I, W. H. Doolittle, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this twentieth day of October, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundred and first.

[SEAL.] W. H. DOOLITTLE,
Acting Commissioner.

39 A. D. 1841. No. 8940.

Paving Streets and Roads.

Reynolds' Specification.

To all to whom these presents shall come, I, Osborne Reynolds, of Belfast, Ireland, clerk, send greeting:

Whereas her most Excellent Majesty Queen Victoria, by her letters patent under the Great Seal of the United Kingdom of Great Britain and Ireland, bearing date at Westminster, the twenty-seventh day of April, in the fourth year of the reign, did, for herself, her heirs, and successors, give and grant unto me, the said Osborne Reynolds, her especial license that I, the said Osborne Reynolds, my ex'ors, adm'ors, and assigns, or such others as I, the said Osborne Reynolds, my ex'ors, adm'ors, and assigns, should at any time agree with, and no others, from time to time, and at all times during the term of years therein expressed, should, and lawfully might make, use, exercise and vend, within England, Wales, and the town of Berwick-upon-Tweed, my invention of "improvements in
40 paving streets, roads, and way," in which said letters patent there is contained a proviso obliging me, the said Osborne Reynolds, by an instrument in writing under my hand and seal, particularly to describe and ascertain the nature of my said invention, and in what manner the same is to be performed, and to cause the same to be enrolled in Her Majesty's High Court of Chancery within six calendar months next, and immediately after the date of the said recited letters patent, as in and by the same, reference being thereunto had, will more fully and at large appear.

Now know ye, that in compliance with the said proviso, I, the said Osborne Reynolds, do hereby declare the nature of my said invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement, reference being had to the figures and letters therein referred to, and to the drawings thereunto annexed.

The first of my said improvements is represented in Figures 1 and 2, and consists in the use of beams or
41 planks of wood arranged longitudinally instead of blocks

to form the surface of roads, streets, and ways. The said beams or planks are to be supported on transvers beams or bearers, which rest on the ground or on any artificial foundation, and may be supported and connected at the ends by longitudinal sleepers. The distance of the transverse bearers from each other must depend on the strength and scantling of the planking which forms the roadway, and the intermediate spaces may be filled in with any suitable material or concrete, or left vacant, according to the peculiar circumstances of the case. The upper surface of the planking is to be crossed and studded with small bars and studs of iron, which will serve to connect the planking firmly together and to obviate the slipperiness of the surface.

The arrangement represented in Figures 1 and 2, and described above, is well adapted for carrying out and putting in practice my invention in respect of this said improvement, and what I claim in respect thereof is the application of planks of wood arranged
42 longitudinally for the construction of a roadway, as hereinbefore described.

My next improvement relates to the construction of a suitable foundation for carrying the surface of the roadway, as well as to the surface itself. This improvement is represented in Figures 3 and 4, the former showing the foundation, consisting of planks, beams, or boards of wood, as *b*, *b*, fastened and connected with, in any suitable manner, the longitudinal beams *a*, *a*, *a*. Upon the foundation, prepared as just described, is to be placed the surface of the roadway, which may consist of longitudinal planks, as described under my first improvment, or of the blocks more commonly in use, or of any of the compound masses, consisting of compressed cane or wood and other substances, as hereinafter described.

The arrangement described and represented of longitudinal bearers and transverse boards is the arrangement which I prefer, but as boards and timber in short lengths may be obtained at a very cheap rate, I also use transverse bearers of iron or wood and longitudinal boards or planks.

43 Another improvement of a similar kind to that last described is represented in Figures 5, 6, 7, 8, 9, of which Figure 5 is a plan or projection of my improved foundation. Figure 6 a transverse section, showing the roadway upon it, and Figures 7, 8, 9, plans and a section of the plates of the foundation. This foundation consists of transverse and longitudinal rods or beams of iron or wood. Plates of iron dished in the middle as in Figure 7, or curved, as in Figures 8 and 9, are placed on the transverse bearers, and connected together in any suitable manner. Upon the foundation so prepared is to be placed the roadway, consisting of any ordinary materials, or of any of the combinations next hereinafter described.

The methods described and represented in the two last-mentioned improvements, are well adapted for the purposes of my invention, and what I claim, as of my invention in respect thereof, is the construction of the foundations of a roadway in the manner described.

My next improvements relate to the construction of the surface

of the roadway, and for this purpose I use stone broken into
44 pieces (as in the ordinary method of macadamizing), and cemented into a mass by concrete or asphalte, or I use cane, rattan, bamboo, or cut or chopped deal, or other wood or sticks, or fibres of broom or such like materials compressed together, with their fibres vertical, as seen at *d*, *d*, or in a slanting direction, more or less, similar to *e*, *e*, Figure 4, or formed into a solid mass by concrete or asphalte. The surface of the roadway is to be formed of a substance compounded in any of the manners just described, and these compound masses may be used on other foundations than those hereinbefore described as of my invention.

And I claim as of my invention, in respect of the last-mentioned improvements, is the construction of the surfaces of roads by the compositions hereinbefore described of broken stone, fibres of wood, concrete, and asphalt.

Another improvement consists in dishing a block of wood, such as is now in general use for paving, and inserting in its centre a plug block or stud of hard wood, iron, or other metal, or of fire brick, care being taken that the said plug or stud does not project above the surface of the block as shown in Figure 12, by the
45 section of the block or stud.

Another improvement consists in constructing the roadway with pieces of the trunks of trees cut into suitable lengths, as from three to ten inches, and placed with their fibres vertical, side by side, in their natural state, without being cut or hewn into any particular shapes. The interstices between these blocks are to be filled up with the compound mass of fibres of wood and concrete or asphalt hereinbefore described.

My last improvement consists in the use of a dowel or tenon, *b*, *b*, of hard wood, iron, fire-brick, or other similar and suitable material inserted into corresponding mortices in the contiguous blocks, as shown in Figures 10 and 11. The mortices are made in a sloping direction, so that the pressure on any one block is distributed partially on all the surrounding blocks. These dowels or tenons can be easily taken out for the purpose of taking up the blocks; and they have this further advantage, that they will be less reduced by friction and wear than the deal wood, and will consequently tend greatly to prevent the slipperiness which is so
46 serious an objection to some of the present modes of constructing wooden pavements.

And I claim as of my invention, in respect to this last mentioned improvement, the use of dowels or tenons inserted in the contiguous blocks, in a direction slightly inclined to the vertical, as last hereinbefore described.

In witness whereof, I, the said Osborne Reynolds, have hereunto set my hand and seal, the twenty-third day of October, in the year of our Lord one thousand eight hundred and forty-one.

OSBORNE REYNOLDS. [L. S.]

Taken and acknowledged by the within-named Osborne Rey-

nolds, at my office, in the Linen Hall, Donegall square, Belfast, this twenty-third day of October, 1841, before me.

SAMUEL GREAME FENTON,
A Magistrate for the County of Antrim.

This is the specification referred to by the affidavit of Charles Chambers, sworn this 27th day of October, 1841, before me.

J. W. FARRER.

47 CHAS. CHAMBERS, cashier to Messrs. Sadler, Fenton & Co., of No. 6 Watling street, in the city of London, maketh oath that he is acquainted with the handwriting of Samuel Greame Fenton, a magistrate acting in the county of Antrim, and that, to the best of his knowledge and belief, the signature to the specification of Osborne Reynolds is that of the said Samuel Greame Fenton. And this deponent verily believes that at the time of the acknowledgment of the said specification the said Samuel Greame Fenton was a magistrate, acting in the county of Antrim.

CHAS. CHAMBERS.

Sworn at the public office, this 27th day of October, 1841, before me. J. W. FARRER.

And be it remembered, that on the oath of Charles Chambers this specification aforesaid was inrolled, word for word, as above written; and also the specification aforesaid was stamped according to the tenor of the statute made for that purpose.

48 Inrolled the twenty-seventh day of October, in the year of our Lord one thousand eight hundred and forty-one.

By affi't. Ex'd. H. H.

(Here follows diagram, marked p. 49.)

50 E.

ROBERT C. PHILLIPS *et al. vs.* THE CITY OF DETROIT.

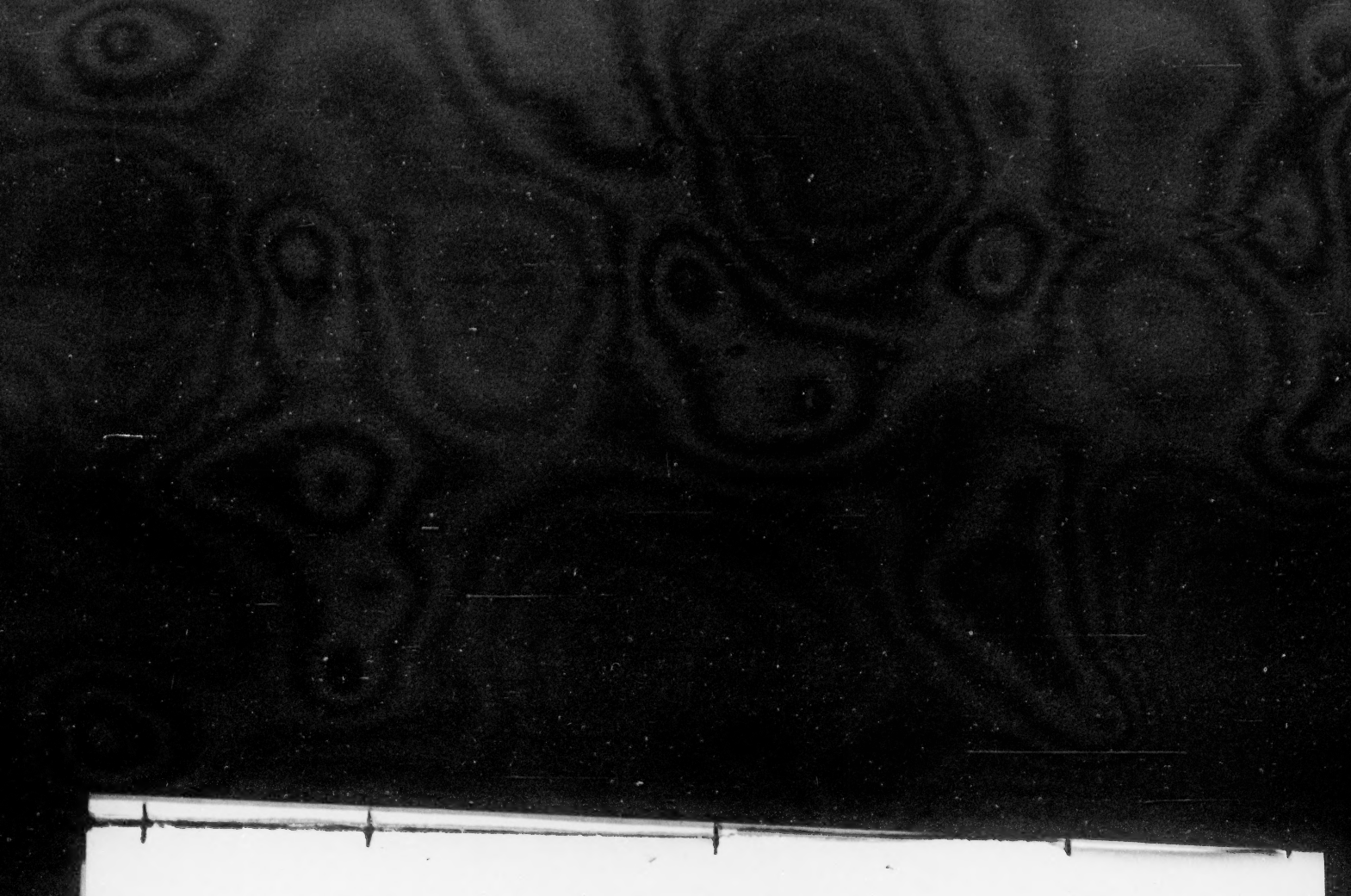
Exhibit E, referred to in the stipulation of April 10th, 1878.

D. CHOLBROOK,
Sol'r for Def.
GEO. H. LOTHROP,
Sol'r for Compl't.

Department of the Interior, U. S. Patent Office.

To all persons to whom these presents shall come, greeting: This is to certify that the annexed is a true copy from the bound volumes of the library of this office of the specification and drawing in the matter of English letters patent granted Peter Armand, Le Comte de Fontainemoreau, dated May 15th, 1844, No. 10187.

In testimony whereof, I, W. H. Doolittle, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed, this twenty-first day of October, in the year of our



Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundred and first.

[SEAL.]

W. H. DOOLITTLE,
Acting Commissioner.

51 A. D. 1844.

No. 10187.

Paving and Covering Roads, &c.

Fontainemoreau Specification.

To all to whom these presents shall come:

I, Peter Armand, Le Compte de Fontainemoreau, of Skinner's Place, Sise Lane, in the city of London, send greeting:

Whereas her present Most Excellent Majesty Queen Victoria, by her letters patent, under the great seal of Great Britain, bearing date at Westminster, the fifteenth day of May, in the seventh year of her reign, did for herself, her heirs and successors, give and grant unto me, the said Peter Armand, Le Compte de Fontainemoreau, my executors, administrators, and assigns, her especial license, full power, sole privilege and authority, that I, the said Peter Armand, Le Compte de Fontainemoreau, my executors, administrators, and assigns, and such others as I, the said Peter Armand, Le Comte de Fontainemoreau, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time,
52 and at all times during the term of years therein expressed, should and lawfully might make, use, exercise, and vend, within England and Wales, and the town of Berwick-upon-Tweed, the said invention for "a new and improved mode or method of paving and covering roads and other ways and surfaces," communicated to me by a certain foreigner, residing abroad, in which said letters patent is contained a proviso that I, the said Peter Armand, Le Comte de Fontainmoreau, should cause a particular description of the nature of the said invention, and in what manner the same is to be performed, by an instrument in writing, under my hand and seal, to be enrolled in her said Majesty's high court of chancery, within six calendar months next and immediately after the date of the said in part recited letters patent, as in and by the same, reference being thereunto had, will more fully and at large appear.

Now, know ye, that in compliance with the said proviso, I, the said Peter Armand, Le Comte de Fontainemoreau, do hereby declare that the nature of the said invention communicated to
53 me, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon, (that is to say):

The new or improved mode or method of paving and covering roads and other ways or surfaces consists in the manner in which I set, assemble, and join together wooden blocks by means of rods, key-rods, pins, or bolts, which I adapt every block and row of paving, so as to consolidate, connect, and bring together every row,

that they may mutually sustain one another, and form thus a whole of adequate solidity, but very easily raised and removed in case of repairs or any other underground operation, and in combining wooden blocks with granite or wooden blocks with bricks, india-rubber, asphalt, cement, marine glue, and other similar substances, to prevent horses slipping, and to increase the durability of the wood by diminishing its exposure to the influence of air and water.

54 The ground for laying my new and improved mode of paving does not require any setting; it is only to be rendered smooth and even, and then to be covered with a bed or layer of sand, by laying the blocks upon a body of sufficient elasticity to yield to the jolts and weight of the passing carriages. The continual resistance offered by a rigid, firm, underground foundation, when heavy loads pass, is therefore avoided. It is easy to conceive that the paving will last much longer if allowed slightly to yield under the pressure of horses and carriages, since by these means the grooves cut out in the wooden blocks will not be so soon worn out, as now happens to every wood paving having masonry or a hardened underground. I cut my wooden blocks by the means usually employed. As some of the several forms of wooden blocks I use, and also my combined paving, require a separate and different mode of jointing and connecting, I will successively describe the several means I have adopted, and those I found to answer best.

55 Figure 1, drawing 1, shows that I form my jointing by means of grooves cut transversely in each block at half its height. The depth and width of the grooves varies according to the size of the blocks. For blocks five and a half inches high the grooves ought to be from three-quarter inch to one and a quarter inch wide, and from an inch to one and a quarter deep; for blocks of four, three and a quarter, three, two and three-quarters, two, and one and three-quarter inches high. The grooves may be respectively three-quarters, five-eighths, halfs, three-eights, quarter of an inch wide. The rods which are to be fitted into these grooves are to bind each row of blocks to its succeeding row, one after the other, as far as required. Each row of blocks is inclined alternately to the right or to the left of the street, and terminates in the voussior, *a*, which occupies the centre of the road, the longitudinal section giving a view of the larger faces of the blocks, and the extremities of the rods shows that the blocks in this view appear perpendicular. The moveable key shows the facility with

56 which repairs may be made. My firm jointing is very easily separated, and will facilitate the taking up and replacement of paving so frequent in streets under which pass numbers of pipes for gas, water, &c. The ease with which these movable keys are removed does not in any degree injure the solidity of the combination. An examination of the plan will prove to the contrary that they even contribute to the solidity by the shape of the rods. These keys, by means of the rods, are bound to the solid blocks, which can neither rise nor sink. These movable keys are seen in a front view at the extremity of the ground plan, and may

be indifferently sloped upon two, three, or four sides, according as it is required.

Figure 2, drawing 1, shows that I form my jointing by the same means as those of the Figure 1. The paving blocks, instead of being inclined as those of the said section, half of them to the right and half to the left of the road, are sloped longitudinally without a voussior. The transverse section shows the rods at their extremities, and the paving blocks in this view appear *vertica* on their largest face. The longitudinal section shows the manner in
57 which the blocks are bound together by the rod and by overlapping each other. This rod pierces half the wood in each row of blocks. It may be of any length, but it must be scarfed—that is to say, every joint must take place in the middle of a block in order to maintain the firmness of the blocks between them. The movable keys are seen in front view in the transverse section, and seen horizontally in the ground plan. It is easy to comprehend the firmness which the rods give by their shape, and the facility with which the movable pieces may be taken up without disturbing the solid parts.

Figure three, drawing 1, exhibits a combination of wooden blocks of eight sides, grooved upon every side at half the height, and square blocks grooved upon their four faces. In these grooves I insert small pins of the same length as the sides, which serve to bind the octagonal to the square blocks. This form of paving allows the employment of round blocks. Any log of wood may be used for this kind of paving. For the rods which fasten together the blocks chips of wood may be used. In the transverse section is seen
58 the jointing of the eight sides with the rods. The longitudinal section differs in no respect from the transverse. The movable keys are placed in the same manner as the preceding; but they differ in that each block can form by itself a key. The key block is divided into three parts, as is shown in the drawing of the movable keys. The middle part, which is used to render the other two parts firm, can be raised with a crowbar, and when once this is raised the rest is taken to pieces easily. I can offer this form of paving at a lower price. It is especially suitable for foot-paths, warehouses, shops, factories, &c. It is also more elegant than the other kinds.

Figure 4, drawing 1, shows that the joints are effected in the same manner as in figure 3, with rods and grooves on the set faces of the blocks, in which are fitted the small pegs, which are of the same length as the faces, and which connect the blocks together. The longitudinal section is similar to the transverse section. The movable keys are similar, and as seen at the extremity of the plan.

59 Instead of hexagonal I can employ with equal advantage circular blocks, as shown in the plan, and two sections which compose figure 17, drawing II. The blocks are laid in juxtaposition, one with another, and can be of different sizes—that is to say, I can place one row of one size and the next row of a smaller size, without decreasing the strength or durability of that mode of pav-

the dotted lines. The movable keys are represented at the extremity of the ground plan.

Figure 12 shows a row of blocks alternately stone and wood, crosswise. The wooden blocks are supported by small brackets cut angularly. These small brackets repose on the longitudinal rods which render the right and left rows firm, between these brackets fit the stone wedge-form blocks. The longitudinal section shows the wooden and the stone blocks, placed vertically and alternately. In the base of these wooden blocks are seen the rods figured longitudinally, which pass behind the granite blocks. The movable keys are placed at the extremity of the ground plan. As I combine the wooden block paving with several substances, I have considered those which would resist more effectually the abrasion caused by the wheels and horse's feet and to choose those which, whilst
66 giving a better and more sure footing, should be less liable to be worn out by the friction; and should present at the same time economy, durability, and simplicity of laying equal to wood; I have also investigated the several relative properties which the substances I had in view possess, as regards expansion and contraction, when compared with wood. Wood during heat contracts, and asphalte, bitumen, india-rubber, marine glue, and other similar substances expand at the same time. On the other hand, during humid and cold seasons, these last contract, and the former swell or expand. I have had, therefore, to discover the exact and relative proportions of these properties in a ratio such that the expansion of the one should be compensated by the contraction of the other when laid together. The failure of all the attempts to combine different materials is due to the want of proper attention to these very proportions. The four last forms of wood paving I have described, videlicet those of figures 9, 10, 11, and 12, I can combine with bitumen, asphalte, india-rubber as well as with granite, hereinbefore described. These forms cause a great economy of
67 wood, half of which is saved in thickness, for wooden paving-blocks two and a half to three inches high may be used instead of five or six inches, as has been thought necessary, and the labour of grooving dispensed with.

Figure 13 shows a transverse and longitudinal section and a horizontal view. The transverse section represents the wooden blocks, and those of bitumen, asphalte, or brick alternately laid. The bitumen blocks are cast, and their form is shown in the transverse section. They are bound to the paving blocks the whole length of the street. The longitudinal section represents a side view of the wooden, bitumen, and brick paving blocks. The brick paving blocks are provided with holes, in order to receive the pins, by which they are united to the other blocks. The pins which are to be inserted in the bitumen or asphalte blocks are placed in the moulds before the casting of the blocks. The movable keys are represented at the extremity of the horizontal view, in which are exhibited the brick and bitumen or asphalte paving blocks.

Figure 14 is composed of transverse and longitudinal sections of a horizontal view of movable keys, and of two blocks

marked A, A. The transverse section shows some paving blocks vertically laid. I compose this mode of paving in two different ways. I use for the first blocks in which I cut on the face grooves half an inch deep, and from one half to one and a half inch wide, into which I firmly fix the small lengths of boards or laths; these grooves are distant, one from the other, three quarters to one and a half inch; the hollow parts between the boards are filled up with bituminous substances. According to the second method I insert in every mould the ends or boards from two to two and a half inch inch long. Their thickness is represented on the transverse section; their width on the longitudinal sections. These pieces are cut in the middle of their height, and placed in the cast-iron mould, which keeps them steady until the base of the block be cast. This base is composed of prepared bitumen, the cost of which is at least two-thirds less than the price of the asphalte, and is as efficient. I make use of the asphalte for the upper part or surface of the paving block, the base being cast as before stated.

I turn over the block and cast the asphalte in the hollow part, and thus by means of the wooden pieces unite the inferior and superior part of the block. The modes of putting together this kind of block renders them easy of removal in any part of the paving. I cut at half the height of the wooden block, on the four faces, grooves from three-quarters to one and a quarter inches square; for the bituminous blocks I insert four small laths in the four sides of the moulds, which form the grooves of the movable blocks, and for the permanent blocks the small rods are fixed into each of them. The transverse section will demonstrate the solidity and facility of removal of this paving, as it represents the small pegs. Half of the surface is occupied by the small laths and the other half by the bitumen, which forms and unites the whole road.

Figure 15 comprises a transverse section, a longitudinal section, a plan, movable keys, two paving blocks, surface views, and a third paving block. Figure 18, also surface view. The transverse section is composed in two ways: First, like the preceding, of grooved logs from two to three inches square, or grooves and holes are cut alternately; in the second method I employ the ends of planks or laths of wood of equal length. These planks and laths may vary from one-quarter to half an inch in thickness, and the bitumen in the same proportions. (See the figure of the two blocks, *a*, *a*, at the extremity of the Figure 15.) This mode of combination differs from the other. This form is put together by small pegs projecting from the middle of the four faces of the block, or equally well from the four angles. The two rows are laid at the same level, and driven together from the jointing. If the blocks are made of asphalte the four faces of the mould ought to be provided with a small plug of three-quarters of an inch and one and a quarter inches in circumference to form the holes for the pegs which bolt the blocks to each other. If the blocks are wooden, holes three-quarters of an inch deep must be bored in the four faces with a brace and a bit; in these holes are inserted small wooden pegs or

pins one and a quarter inch thick; half of each peg enters the block on its right and the other half the block on its left. The pegs may also be made of metal. These holes ought to be accurately
71 pierced from the side of contact. In this form, also, I lay a foundation of logs, and the holes intended to receive the pegs or pieces are bored obliquely. From this obliquity results still greater firmness. The crossing of the pins also prevents the shifting of the surface. The facility of removal is obtained in the same manner as in the key. Figure 16, in the longitudinal section the thickness of the peg or pin is shown, and the place it occupies is shown in Figure E E.

Figure 16 comprises a transverse section, a longitudinal section, a surface view, movable keys, a paving block. Figure 19, a small ground plan, and two longitudinal sections. The transverse section shows a row of blocks placed vertically. This kind of paving is composed like the preceding, of a foundation of asphalte; the square pegs or bits being fixed in this foundation alternately, like a chequer-board. (See surface view.) I also use for the foundation of this kind battens, placed flat, one against the other, and pierced alternately with holes to the surface to receive the pegs or bits, which foundation is more economical than the planks mentioned in
72 the preceding kinds. I have nevertheless shown that it can be composed of planks. (See longitudinal section.) The longitudinal and transverse sections show the manner in which the pavement is put together by means of small circular discs projecting horizontally from the four angles or from the side of the blocks. The size of the disc is shown in the block and in the small ground plan. The surface view shows that the square pegs or bits form the alternation of a chequer-board. In order to alternate the rods or the pegs, I arrange the holes as in a chequer-board. If I make the foundation of planks they are grooved half an inch apart; the ridge of the first facing the hollow of the second, and so on. It will be seen by this construction that the bitumen is always protected by the small ends of the pegs or bits, and the feet of the horses find resistance and security. The construction of these last four kinds can also be adapted to wood paving.

Although I have represented the bitumen in the plans as covering three-fourths of the paving, this will only be done in those countries where bitumen is not so dear as wood. I can also arrange the paving blocks so as to give resistance to the feet of
73 the horses by allowing half of the blocks to project three-quarters of an inch above the other half. I can also do this in some of the other forms. In countries where wood is cheaper than bitumen, the lower part may be of wood. If, on the contrary, the foundation is in bitumen the pegs ought to be inserted in an iron plate which is provided with mortices or holes sunk in the plate about three-quarters, one, or one inch and a half. This plate is adjusted in the mould according to the thickness of bitumen required. That being done, I place in the small mortices or holes the pegs, which only penetrate to the above-mentioned depth. When this operation is finished, the mould must be turned over in order

to cast the block. This plate serves three purposes; firstly, it supports the pegs; secondly, it forms the bottom of the box; thirdly, it regulates the thickness of the bitumen surface. If wooden blocks are used the four corners should be cut off with a saw previous to the fixing of the peg or pin.

As I have stated in the preceding figures, that grooves are
74 cut in the paving, I shall here describe more particularly the way, manner, and form in which the same are to be performed. To commence with the surface of the block (see Figure 5, Drawing II), I cut grooves vertically, and always with the fibre of the wood, from one to one and a half inch deep, but I do not confine myself to any particular size; that is to say, I reserve to myself the right of leaving more or less space. In each block are cut longitudinally with the street grooves from one-half to one inch wide, and about one inch deep, and transversely grooves of the same dimensions, which form on the surface a kind of reticulation in which the bitumen is poured and unites the whole. I make indiscrimately holes or channels. These holes appear at the surface somewhat similar to a plank for bottles (see Figure 6). I make another arrangement by cutting away from the faces of the block three-quarters or one inch of wood, which space will be afterwards filled with bitumen. I make also a surface of which half of the blocks are alternated as in a chequer-board. In order to make this kind of paving, half of the blocks ought to be at least one or two inches shorter than the rest. All these blocks are pierced
75 with holes in which pegs are driven crosswise, and which thus connects the bitumen with the wood. I can equally well connect the block and the bitumen by a dovetail on the four faces. I make also another arrangement by pouring the bitumen in a mould of the same form as the blocks, the block of wood and the block of bitumen being laid down alternately, as in a chequer-board; that is to say, that the block of bitumen coming from the mould will have a channel of the same form as that in the wooden block, and is to be put together with the rod of wood. To complete my systems of paving I have adapted kennels of my own construction. They serve three distinct purposes. They serve, first, as a border to the foot pavement; secondly, as conduits for the rain and other water; and, thirdly, they carry off the mud which accumulates in the old gutters. It is easy to understand their construction from the various sections of paving, where they are represented at the two extremities. I place the kennels on a bed of masonry to maintain them perfectly even. They are cast in iron in the
76 ordinary manner, and can be of any length, but the extremities of each length must be of an angular form so as to jut into each other.

And having now described the new and improved mode or method of paving and covering roads and other ways or surfaces, I declare that I do not claim as of the invention communicated to me the several forms or shapes of the paving blocks of wood, granite, bitumen, asphalte, or brick, as they are already in use. But what I claim as the invention is—

First. The mode or method of preparing the ground by a layer of sand for the wooden, and combined wood and granite, wood and brick, asphalte, bitumen, kinds of paving as I have before described.

Secondly. The mode of combining the several forms of wooden blocks; also of wooden blocks with granite, and wooden blocks with brick, asphalte, or bitumen blocks, as I have before described.

Thirdly. The mode of combining wooden blocks with bitumen and asphalte, to form paving blocks in such proportions as to allow for their expansion and contraction, as I have before described.

77 Fourthly. The mode of uniting, jointing, connecting, and supporting the paving blocks by means of rods, pegs, nuts, or keys, so that every block is jointed, consolidated, and supported by the adjacent one, and each row of blocks forms a whole along the transverse section of the way, as I have before described.

Fifthly. The mode of constructing movable keys, by means of which any part of the service can be raised in case of need, and replaced without permanently deranging the paving blocks, or the surface itself, as I have before described.

Sixthly. The mode of gooving or preparing the wooden paving blocks with cement, mastic, bitumen, asphalte, marine glue, and india-rubber to prevent the horses from slipping, as I have before described.

And such the invention being, to the best of my knowledge and belief, entirely new and never before used within that part of Her said Majesty's United Kingdom of Great Britain and Ireland,

78 called England, her said Dominion of Wales and town of Berwick-upon-Tweed, I do hereby declare this to be the specification of the same, and that I do verily believe that this specification doth comply in all respects fully, and without reserve or disguise, with the proviso in the said hereinbefore in part recited letters patent contained; wherefore, I hereby claim to maintain exclusive right and privilege to the said invention.

In witness whereof, I, the said Peter Armand, Le Comte de Fontainemoreau, have hereunto set my hand and seal, this fifteenth day of November, in the year of our Lord one thousand eight hundred and fifty-four.

P. DE FONTAINEMOREAU. [L. S.]

And be it remembered, that on the same fifteenth day of November, in the year above mentioned, the aforesaid Peter Armand, Le Comte Fontainemoreau, came before our lady the Queen, in her chancery, and acknowledged the specification aforesaid, and all and everything therein contained, in form above written. And also the specification aforesaid was stamped according to the tenor of the

79 statute in that case made and provided.

Inrolled the same fifteenth day of November, in the year above written.

R. RICHARDS.

Ex'd. E. A. M.

(Here follows diagrams, marked pages 80 and 81.)

layer
od and
re de-

ooden
blocks
ribed.
umen
allow
ribed.
g, and
nuts,
ported
along

ans of
l, and
or the

aving
e, and
before

nd be-
r said
eland,
wn of
pecifi-
cation
guise,
patent
right

Fon-
n day
ndred

s.]

nber,
omte
cery,
thing
ifica-
f the

year

os.

82

I.

ROBERT C. PHILLIPS *et al. vs.* THE CITY OF DETROIT.

Exhibit "I," referred to in stipulation of April 10th, 1878.

D. C. HOLBROOK, *Sol'r for Def't.*
GEO. H. LOTHROP, *Sol'r for Compl't.*

Department of the Interior, U. S. Patent Office.

To all persons to whom these presents shall come, greeting: This is to certify that the annexed is a true copy from the bound volumes of the library of this office of the specification and drawing in the matter of English letters patent granted John Lindsay, dated June 14th, 1825, No. 5185.

In testimony whereof, I, W. H. Doolittle, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed, this fourteenth day of October, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundred and first.

[SEAL.]

W. H. DOOLITTLE,
Acting Commissioner.

83

Lindsay's Specification.

To all to whom these presents shall come, I, the Honorable John Lindsay, of the Island of Herme, near Gurnsey, send greeting:

Whereas his present Most Excellent Majesty, King George the Fourth, by his letters patent, under the great seal of Great Britain, bearing date at Westminster, the fourteenth day of June, one thousand eight hundred and twenty-five, in the sixth year of his reign, did, for himself, his heirs and successors, give and grant unto the said John Lindsay his especial license that I, the said John Lindsay, my ex'ors, adm'ors, and asssigns, or such others as I, the said John Lindsay, my ex'ors, adm'ors, and assigns, should at any time agree with, and no others, from time to time and at all times during the term of years therein expressed, should and lawfully might make, use, exercise, and vend, within England, Wales and the town of Berwick-upon-Tweed, and also in his said majesty's

84 colonies and plantations abroad, my invention of "certain improvements in the construction or formation of horse and carriage ways of streets, turnpike, and other roads, and an improvement or addition to wheels to be used thereon," in which said letters patent there is contained a proviso obliging me, the said John Lindsay, by an instrument in writing under my hand and seal, particularly to describe and ascertain the nature of my said invention, and in what manner the same is to be performed, and to cause the same to be inrolled in his said Majesty's High Court of Chancery within six calendar months next and immediately after the date of the said in part recited letters patent, as in and by the same, reference being thereunto had, will more fully and at large appear.

Now know ye, that in compliance with the said proviso, I, the said John Lindsay, do hereby declare that the nature of my

85 said invention, and the manner in which the same is to be performed, are particularly described and ascertained in and by the drawing hereunto annexed, and the following description thereof:

I shall here observe that the great desire that prevails at present for covering or constructing streets and roads with broken granite, or other hard and durable stones, may be productive of much service to the public when judiciously applied, and more particularly so when combined with certain portions of pavement so placed as to bear the weight of carriages and receive the action of the wheels, which has hitherto been found so destructive to streets or roads covered with broken stones only. In order to produce the best effect from a combination of pavement, broken granite or other hard stones, I construct streets, turnpike, and other roads in the following manner, that is to say:

86 Fig. 1 represents a portion of a road or street constructed in my improved way. A, A represents a line of granite curb stones laid transversely in the centre of the street or road, being sufficiently wide to permit the wheels of two carriages to roll upon them and pass each other; these should be laid upon a firm base of hard materials, by which means they will form a very permanent and lasting plane surface. B, B are similar lines of granite or other hard stones placed parallel to and equidistant from the centre line, upon which the wheels on one side of the carriage roll. These are to be laid transversely also, and form on each side of the street or road an even and permanent surface for the wheels on one side of any carriage to roll upon. C, C represents a gutter formed of granite, hollowed out of sufficient depth to receive the rain or other water that falls upon the surface, and convey it to the gratings as usual. By these means the gutters will be capable of sustaining the weight of any carriage without

87 the risk of being disturbed, as is so frequently the case in the way they are constructed by the common method of paving. D, D, D, D represents the intermediate portions of the surface between the lines of stone before named paved with the common or usual-sized paving stones, but the method of arranging or laying them is as follows: Instead of laying them with their broadest ends upwards I lay them with their broadest ends downwards; and as each stone is made of a wedge form, this leaves a considerable space open between the stones; these I close with smaller stones of a wedge form, which, being carefully placed and well rammed down after a sufficient quantity of fine gravel or grout has been worked between them, will make a pavement nearly as substantial as a solid sheet of granite, well suited to enable horses to travel on safely, while the lines of large transverse stones will form a surface to receive the action of the wheels, and be nearly equal in point

88 of smoothness to a well-formed railway.

Fig. 2 represents a transverse section of the street or road so formed in with the arrangement of the smaller or intermediate pavement will be more plainly seen; *a*, *a*, *a* show the common stones laid with their broadest ends downwards, and *b*, *b*, *b* repre-

sent the wedge-formed pieces that are driven in to make the whole as nearly solid as possible. By placing or arranging the stones in the way herein described a great quantity of the small wedge-formed pieces or chips of granite usually produced in working a quarry will be brought into use and essentially contribute to render pavement with the common stones much more permanent and effective than any method heretofore known or made use of.

Fig. 3 represents a portion of the centre of a turnpike or other road, with two lines of my improved wheel tracks formed of large stones laid transversely. The intermediate space is covered
89 with broken granite or other hard and suitable material; and in order to render the track for horses as permanent as possible, I would recommend the under surface to be covered with rough stones laid with their broadest ends downwards, as shown at E, E, and between these wedge-formed pieces should be laid to fill in the interstices, over which a stratum of broken granite should be laid of the usual thickness, and when finished the whole should lay rather higher than the surface of the transverse stones of the wheel tracks. F represents the intermediate space of the road between the wheel tracks made complete. When roads are constructed in this manner they will be capable of sustaining almost any weight, which will be moved with much less exertion by the horses, and the great complaint of wear of the roads will be most materially prevented, it being a well established fact that all the great public roads are delapidated almost entirely by the
90 action of the wheels of heavy-laden carriages, and not by the feet of horses.

The construction of a cheap and durable railway that might be laid upon a public road, has been very much sought for, yet no plan has hitherto presented itself that would answer the purpose; but it may be effected with the greatest ease, burability, and comparative cheapness, in the following manner: Fig. 3, G, G, G, represents a line of paving stones laid on the side of the road out of the way of the usual carriage and horse track. *c*, *c*, is a triangular wrought iron bar united in lengths ten feet long and one inch and a half thick; the end of each length or bar is bent at right angles downwards, the bent ends being about an inch and — half in length; these enter holes formed in the large stones, H, H, and are made fast by pouring in melted lead in the usual manner. The line of stones are laid upon a well rammed surface of very
91 hard materials, and every care should be taken to make the foundation for them as permanent as possible, and in this simple way a very effective and durable railway will be produced. When such a railway is used on each side of a road, the rims of the two near side wheels of the wagons that are used upon them should be grooved so as to fit the triangular bar, as shown by dotted lines in Fig. 4; the other two wheels may be constructed in the usual way, as they will have to roll on the line of stones seen at I, I, in Fig. 3, and for this purpose the stones of that line are made as wide as the center line, so that the common carriages may pass

on the same line of stones without producing any impediment to the carriages on the railway.

Fig. 5 represents a side view of a fragment of the iron rail of the real size. *d* shews the end that is bent down to enter the hole formed in the stone, and being made rather broader at the bottom, and the hole being also rather undercut, when the lead is
92 poured in it will be very firmly and immovably fixed.

Fig. 4 shews a section across the triangular bar; the dotted lines represent the shape of the grooved wheels that are used to run upon the rail, and by which they are kept in their right course.

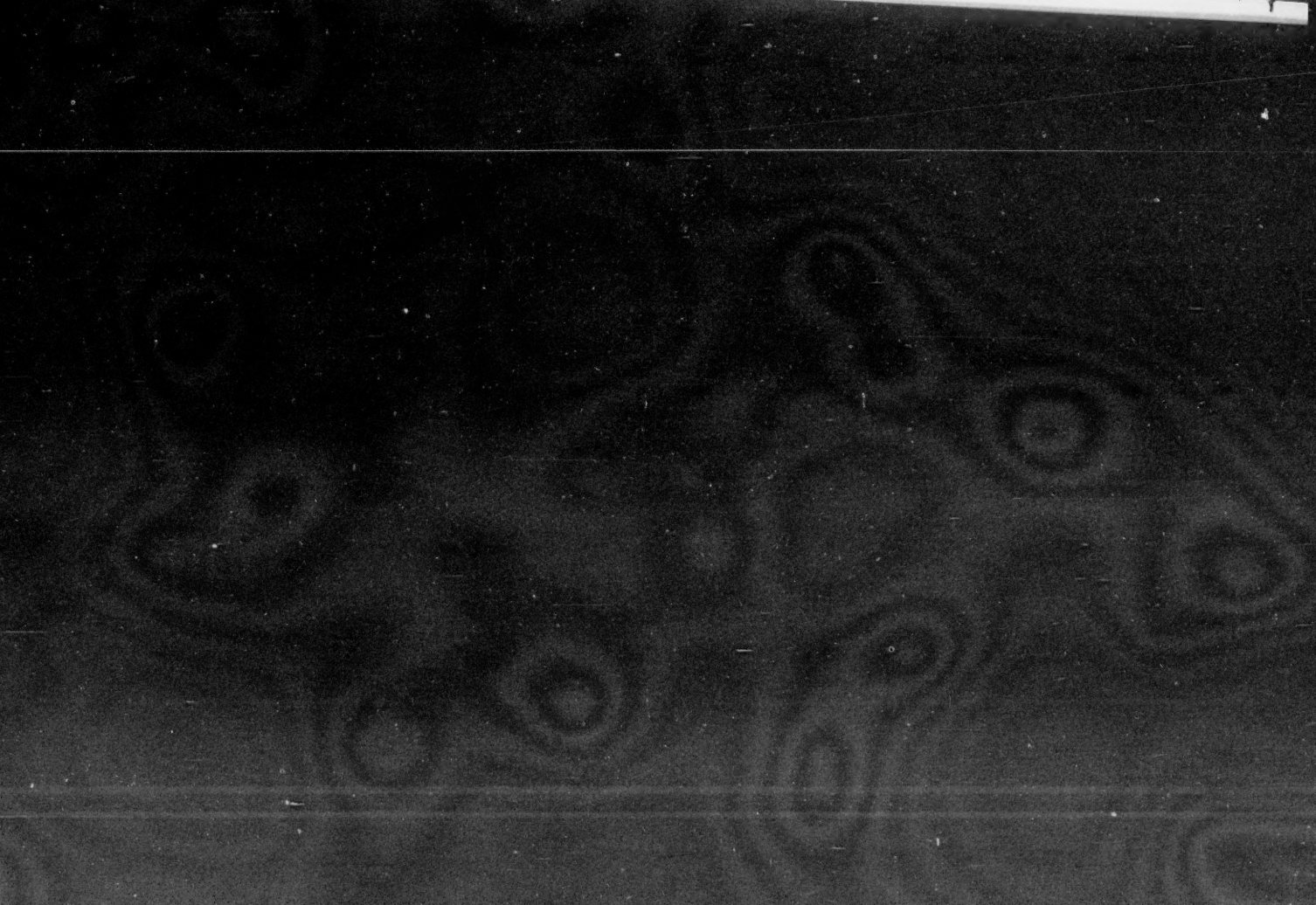
Fig. 6 represents a vertical and longitudinal section of a portion of the paved line that supports the triangular rail; the way it is inserted and secured in the stone will be clearly understood by this figure, the same letters of reference being used as in Figure 3.

Figure 7 represents a line of pavement formed of granite stones; the upper surface of these are grooved to receive a line of cast-iron plates, with cogs formed upon them as shewn at *e*, *e*, *e*; these plates are fixed to the stones in a similar way to that described in the triangular bar, the projections on each plate being cast with it, each being about three feet long.

93 Fig. 8 represents a side elevation of a fragment of the iron plate *e*, *e*, and also two of the cogs cast with it; this and Fig. 9 are drawn to a scale of six inches to a foot.

Fig. 9 shows a transverse section of the plate, the part that is fixed in the stone is shewn in each figure at *f*, *f*, when such a railway is laid down properly, it may be used either with the common sort of rail wagons, or it may.— used in combination with the locomotive engine, by applying my improved wheels to the wagons or carriages.

Fig. 10 represents a front view of a cast-iron cog wheel. The cogs are formed as usual on the periphery, being about two inches thick, and upon each side a projecting rim is formed, seen at *g*, *g*. *h*, *h* represents a cast-iron ring made to fit the circumference of the projecting rim, *g*; there is a similar ring on the other side of the wheel, each being united to the wheel by bolts and nuts. The front rim has a part removed in order to show the cogs on the
94 periphery of the wheel, and also to show that each rim, *h*, *h*, projects beyond the ends of the cogs about an inch all around. When a wheel thus constructed is placed upon the rail the cogs will gear into those formed on the rail, and the projecting rims, *h*, *h*, will rest and roll upon the surface of the granite stone. It will, of course, be understood that only one such a wheel will be necessary for a locomotive engine, the other wheel to be used on the same side must be made the same in every particular, except the cogs, which are to be omitted. If wheels are constructed as herein directed, without cogs, they may be cast in one entire piece, and when properly finished they will pass over the cogs on the rail, while the sides of the line of cogs will serve as well as a common rail to keep them in proper direction. Of course it will be understood that it is only on one side of each carriage that such wheels will be



95 wanted, because the line of granite that is shown at I, I will only require wheels of the common construction.

Fig. 11 represents a vertical section of the cog wheel, and the two rings, taken through the centre of Fig. 10. Where it is necessary that the rail wagons should deviate from a straight line, the rails may be joined at one end, as usual, which will enable the driver to shift them at pleasure, so as to correspond with any new line of direction that may be required.

And I hereby further declare that my improvements consist—

Firstly. In constructing wheel tracks for carriages on streets or roads with curb-stones laid transversely.

Secondly. I do not claim the sole right to pave with stones having their broadest ends laid downwards.

Thirdly. I also claim the sole right to combine a single
96 railway with my improved wheel tracks, by which means all the advantages of a common railroad will be obtained, while the passage for carriages of all other descriptions remains without obstruction.

Lastly, by combining and adding projecting rings to cog wheels in the way I have shown, they may be made to support a part of the weight in the carriage to which they are fixed, while the cogs will be used to propel it forward, if locomotive engines are used, forming, altogether, considerable improvements in the construction of horse and carriage ways in streets, turnpike, and other roads, and an improvement or addition to wheels to be used therein.

In witness whereof, I, the said John Lindsay, have hereunto set my hand and seal, this thirtieth day of November, in the year of our Lord one thousand eight hundred and twenty-five.

JOHN LINDSAY. [L. S.]

97 And be it remembered that on the first day of December, in the year of our Lord 1825, the aforesaid John Lindsay came before our said Lord the King, in his chancery, and acknowledged the specification aforesaid, and all and everything therein contained and specified in form above written; and also the specification aforesaid was stamped according to the tenor of the statute made for that purpose.

Enrolled the second day of December, in the year of our Lord one thousand eight hundred and twenty-five.

HARVEY.

Ex.—J. A. W.

(Here follows diagram, marked page 98.)

99 J.

ROBERT C. PHILLIPS *et al. vs.* THE CITY OF DETROIT.

Exhibit "J," referred to in stipulation of April 10th, 1878.

D. C. HOLBROOK,
Sol'r for Def't.

GEO. H. LOTHROP,
Sol'r for Comp'lt.

also with a mode of securing both sorts of rails down upon bearers of wood by nails driven through the iron and through the wood into continuous bearers of asphalte or other suitable cement laid in trenches dug in the road, the points of the nails being made thicker or broader than the shanks, and driven in while the cement
105 is soft so that the cement may collapse around the neck of the nail and prevent its being drawn out. And—

Seventhly. My improvements in roads and ways consist, according to my first mode, of paving them with blocks of wood, having the grain inclined to the horizon in some angle, varying from about forty-five degrees to about seventy degrees, the grain of all the blocks leaning in the same direction or towards the same point of the compass. And according to my second mode of paving with similar blocks as in my first mode, but the alternate rows of blocks leaning toward the opposite points of the compass, each pair of oppositely leaning blocks being sometimes held together by a dowell passing through the middles of both blocks. And according to my third mode, in paving with planks or blocks of wood having the grain lying in any direction, in combination with nails thickly driven into their upper surfaces, the two-fold object of the nails being to diminish wear and afford hold for the horses feet and prevent their slipping. And according to my fourth mode of paving with blocks or planks having their grain lying, standing,
106 or leaning in any direction, in combination with grooves cut in the sides of the blocks or planks, and in the placing of tongues or keys of any suitable material into each pair of meeting grooves, for the purpose of causing each block or plank reciprocally to support and be supported by the contiguous blocks or planks. And according to my fifth mode, in paving with blocks or pieces of wood of any convenient figure, with the grain either vertical or inclined, cemented together by filling the interstices between the blocks with a mixture of sand, pulverized chalk, brick-dust, or other earthy matter, united with pitch or other bituminous substances, or suitable cement, which mixture will melt or soften by the application of heat, but remain firm at the highest summer temperature. And in order to take up such blocks or batches of block for laying gas or water pipes, I provide a lever of iron, having a wooden handle; the iron end being made hot is thrust down into the interstice to melt the cement and lift it out; several such levers being heated at one time may be used simultaneously or in rapid succession, so that a block or a batch of
107 blocks may be quickly separated from those surroundings. And I also provide a plough or coulter, of copper or iron, for the same purpose, kept hot by a fire made around it, while it is drawn along the interstice. And, according to my sixth mode, in paving with blocks of wood of any figure, upon a foundation of sand, ashes, or saw-dust, saturated with tar or bituminous substance, especially if boiled, laid upon the natural ground for the blocks to rest on. And, according to my seventh mode, in cutting furrows or grooves in any direction, a few inches apart across the upper surfaces of the blocks of wood used in paving, whether the grain

be vertical or inclined to the horizon; but in the case of small blocks being used, the grooves or furrows are formed by chamfering off the outer edges of the upper surfaces of the blocks, which furrows and chamferings may be made deep, and filled up with asphalte or other cement, or gravel and sand, the object being in both cases to prevent the horses' feet slipping. And, according to my eighth mode, in laying down on the sides of streets concave plates of iron, screwed or nailed down upon longi-
108 tudinal bearers of wood, sunk at a proper depth below the roadway.

And the manner in which I carry these, my various improvements, into effect is shown by the drawings hereunto annexed, which are to be taken to form a part of this my said specification, and by the explanation of the same as hereinafter contained.

Description of the Drawings.

Figure 1 represents the profile of a carriage, with the horse suspended from the apparatus placed at the front of the carriage. Figure 2, plan of part of Figure 1, with the body of the carriage and the horses omitted, in order to shew the framework apparatus under and in front of the carriage more distinctly. Figure 3, front elevation of Figure 1, with the horses omitted, to shew the apparatus more distinctly.

The carriage as represented in these three figures is designed for being run on common roads, but I make a modification for exclusive use on such railroads as are unconnected with common roads by fixing each pair of wheels upon one common revolving axle in the ordinary manner, and placing flanches on the inner sides of the wheels to keep them from running off the rails, and I
109 also remove the connecting-rods and fix the hinder axle parallel to the fore axle. The letters and numbers of reference signify the same parts in all the three figures—1, 2, and 3. *a* represents the fore-wheels of the carriage, which are placed far forwards, in order that the weight of the carriage may have good leverage power for lifting the horses; *b*, the axle-tree of the front wheels, *c*, the hinder wheels; *d*, the axle-tree of the hinder wheel. This axle-tree turns on a centre-pin under a cross-bar, upon which the springs of the carriage are bolted. *e*, the hinder cross-bar of the carriage frame, under which the axle-tree, *d*, turns; *f*, the centre-pin, fixed in the cross-bar, *e*; *q*, two iron rods holding the cross-bar, *e*, and fore axle, *b*, parallel to each other; *h*, two iron rods for the further bracing of the bar, *e*, and front axle-tree together; *k*, four springs for supporting the carriage body; *l*, the carriage body; *m*, the seat for the driver; *n*, an upright frame of wood affixed upon the front axle-tree; *p*, two iron diagonal braces to strengthen the frame *n*; *q*, two iron rods to support the top of the frame, *n*, from the cross-bar *e*; *r*, an
110 horizontal frame projecting forward from about the middle of the height of the upright frame *p*; *s*, two iron diagonal braces for strengthening the frame *r*; s^1, two iron rods for keeping the outer ends of the frame, *r*, at proper distances; *t*, three braces of

wood for supporting the front end of the horizontal frame, *r*, from the axletree *b*; *u*, three strong iron bearing bars secured to the upper end of the upright frame *n*, and to the front end of the horizontal frame *r*; *v*, a shaft lying across and revolving on the middle parts of the three bearing bars *u*; *w*, a toothed wheel fixed on the end of the shaft *v*; *x*, a worm working in and driving the toothed wheel *w*; *y*, a spindle and winch for turning the worm, *x*; *z*, a shaft, lying across and revolving on the front parts of the three bearing bars *u*. 1, four pullies, fixed on the shaft *v*, to which eight ropes are fastened, four of which ropes hang down perpendicularly from the front sides of the pullies. 2, four pullies on the shaft *z*, over which pullies four of the ropes of the pullies, 1, pass and hang down perpendicularly from the front sides of those front
111 pullies. 2, two broad belts each secured by four corners to two of the ropes hanging down from the pullies 1, and to two of the ropes hanging down from the front pullies 2, each of these belts being designed to support a horse. 4, two connecting rods for turning the hinder axletree. 5, two arms, jointed with and acting on the connecting rods 4. 6, an upright spindle, carrying the two arms 5, and turning in bearings affixed to the upright frame *p*, and on the axletree *b*. 7, a lever or handle affixed on the upper end of the spindle 6 for turning the spindle, and thereby the arms, and by means of the connecting rods turning the hinder axletree, and its wheels to guide the carriage. This handle may, by means of a spring catch of any ordinary construction, be held in such position as shall keep the hinder axletree parallel to the fore axletree when running upon railways. 8, a break and bent lever, turning on a stud in the upright frame *p*, and acting against the back of the fore wheel of the carriage, the handle of the lever reaching up near to the seat of the driver.

Figure 4 shows an outside view of a compound railway
112 wheel. Figure 5 an inside view of the same, or that side of the wheel which is next to the carriage. Figure 6 a transverse section of the wheel through the axis. The same letters and numbers of reference signify the same parts in figures from 4 to 13, both inclusive. A, twelve sectors of wood, extending when first put together from the centre to the circumference of the wheel, the direction of the grain running from the circumference towards the centre; *b*, a circular plate and boss of cast iron, bolted on to the outside of the wheel: *c*, a circular plate and boss also of cast iron, bolted on to the inside of the wheel, the bolts passing through both plates, and through all the sectors, the plates being brought closely to embrace the wood by means of nuts at the outside of the wheel; *d*, the bolts; *e*, the nuts; one of the nuts is shown in two views of a large size at Figure A, where it will be seen that the under corners of the nut are chamfered off. When the nut is tightened up to the requisite degree, I bind around the nut a piece of annealed wire and draw it tightly in under the four corners of the nut, and
113 twist the two ends of the wire together, by which means the nut will not be liable to be shaken loose in the working of the wheel; this mode of holding the nuts from being shaken loose

applies to the nuts of all the wheels hereinafter described. The nave may be made all of iron by casting a central hollow cylinder projecting from the inside of one boss, and fitting tightly into a bored aperture in the middle of the opposite boss; *f*, twelve plates of iron screwed on over the sectors, on the inside of the wheel, to give further support to the outer ring in addition to the bolts; *g*, the screws for screwing the plates *f*; *h*, a ring of cast iron, forming the flanch, to keep from running off the rails. This ring is kept concentric with the bosses by means of the plates *f*, as well as by the bolts of the ring: *k*, a ring of iron opposite the ring *h*, the two rings being firmly bolted together upon the wood near the circumference of the wheel; *l*, the bolts; *m*, the nuts; *n*, a slot for a key to fasten the wheel on to the axle. When all the nuts are tightly turned on and screwed by binding wire, the wheel is affixed
114 to a face plate in the lathe, where the centre hole is bored out, iron and wood together, and the periphery of the wood part turned truly, and thus the wheel is finished, ready to be fixed on to the axle. Although the plate, *b*, and the ring, *k*, are shown as lying upon the wood on the outside of the wheel, yet they may be wholly or in part let into the wood, and lie in recesses turned in the wood for their reception.

Figure 7, outside view of a railway wheel, having an outer hoop or tire of iron with a flanch projecting from it, the main body and spokes of the wheel being made of iron and wood combined. Figure 8, transverse section of the same through the axis and through the middle of a spoke. *p*, two castings of iron forming the principal part of the two sides of the wheel, each casting consisting of a boss of eight broad arms or spokes, and of a ring chamfered or bevelled at the circumference, all cast together in one piece; the boss is bored out and the bevelled circumference of the ring turned in the lathe. *q*, a cylindrical piece of wood bolted in be-
115 tween the two bosses. *r*, eight pieces of wood, two of them visible in the section filling up the spaces between the arms and extending from the pipe *q* to the commencement of the bevel of the iron ring. These pieces of wood are respectively compressed by bolts and nuts between the two iron arms. *s*, a double ring of wood fitted in segments around the cast-iron ring, and within a hoop forming the periphery of the wheel. *t*, the hoop or tire; *u*, the flanch to keep the wheel from running off the rails; *v*, an inner rib to keep the hoop or tire from slipping off from the double ring of wood *s*. In order to form the double ring *s*, I first fix the segments of one half of the width of the ring, dowelled or tongued together against a face plate in the lathe, and turn the outside of the wood to fit within half of the width of the hoop or tire, *t*, turning also a rebate to receive the half of the thickness of the rib *v*, and I turn the inner side of the wood to fit the outer and bevelled circumference of one of the castings *p*; I then remove this half ring of wood from the face plate, and affix the other half ring of
116 segments and turn them into the same figure and size as the first half ring. In proceeding to put the wheel together, I first lay one of the castings, *p*, on a level support, with the outside

downwards, and lay one-half of the ring of wood, *s*, around and against the bevelled circumference of the casting, and then lay the eight pieces of wood upon the arms or spokes, and the cylindrical piece of wood, *q*, on upon the boss; I then heat the iron hoop or tire, *t*, and place it outside around the half ring of wood. I next lay the other half ring of wood upon the first half ring within the hoop, and the other casting, *p*, upon the wooden spokes and upon the cylindrical piece of wood, and quickly pass the bolts through the arms and the bosses and put on the nuts, turning them as tightly as possible before the hoop has time to lose much of its heat; the hoop will then shrink on and tightly embrace the double wooden ring, *s*, and there will be no risk of its becoming loose if care be taken to form the rings, *s*, of dry, of boiled, or of steamed wood.

Figure 9, a view of a wheel for running upon common roads.

Figure 10, transverse section of the rim and nave, through
117 the axis, with a view of two of the spokes, *w*, the nave of iron cast on upon the broad ends of the spokes *x*, the arms or spokes of sheet iron about an eighth of an inch thick, the broad ends cast into the nave and the narrow ends into the felloe, *y*, the felloe of iron cast on upon the extremities of the spokes, having a rebate on each side of a middle rib for the reception of the two halves of the wooden felloe, *z*, the wooden felloe bolted in two thicknesses to each other through the rib of the fellee *y*; two light rings of iron may be put on the wood under the bolt heads and nuts, or they may be let into the wood if desired to afford greater security to the blocks.

Figure 11, view of the inside of a wheel for running alternately upon common roads and upon railways.

Figure 12, view of the outside of the same wheel. Figure 13, transverse section of the same, through the axis, 1, the felloe of iron cast on upon the extremities of the spokes, as described in the last mention, 2, the wooden felloe bolted on to the side of the iron felloe, 3, recesses in the iron felloe, to lighten the wheel.

118 Figure 14, elevation of a piece of railway made of wood. Figure 15, transverse section of the same. Figure 15½, plan of the same. The letters of reference signify the same parts in Figure 14 to 20, both inclusive. *a*, pieces of hard wood having the grain vertical or nearly vertical. *b*, cheeks formed of planks of wood with the grain horizontal, bolted on against the two sides of the pieces *a*. Figure 16, longitudinal and vertical section of a tram rail and of an edge rail meeting together and leading one into the other. Figure 17, plan of the same. Figure 18, transverse section from B to C. Figure 19, transverse section from D to E. Figure 20, transverse section from F to G, *c*, the tram rail; *d*, the edge rail; *a*, an inclined piece leading from the side of the tram rail on to the edge rail; *f*, bearers of wood under the two kinds of rails; *g*, bearers of asphalte or other cement laid in a trench dug in the common road, the asphalte bearers supporting the iron *h*, nails driven through the iron rails and wooden bearers into the asphalte bearers; *k*, oblong holes in the rails to allow room for driving a second nail in case the first should not hold firmly or could

not be readily drawn out. Should it be required to drive a nail into the asphalte after the asphalte is cold, the nail must be heated and driven while hot. Figure 21, represents a view of a row of blocks of wood cut with the grain inclining to the horizon. Figure 22, two blocks inclined in a similar manner. Figure 23, elevation of a pair of blocks leaning in opposite directions and dowelled together. Figure 24, plan of the same. Figure 25, plan of a plank thickly studded with nails. Figure 26, transverses section of two such planks tongued together. Figure 27, view of a row of blocks stretching across a street and appearing rectangular, the leaning being towards the length of the street. Figure 28, a pair of upright blocks in combination with grooves for the reception of tongues or keys between them and the contiguous blocks. *l*, see Figures 21, 22, 26, 27, and 28, represent grooves for the reception of tongues or keys. *m*, see Figures 22, 25, 26, and 27, represents tongues or keys laid in some of the grooves. *n*, see Figures 21, 28, and 29, shows grooves or notches in the upper surfaces of the blocks. *p*, similar grooves formed by chamfering of the edges of the blocks. *q*, see figure 21, grooves filled with asphalte; *r*, see figure 27, concave gutter-plates nailed down upon wooden barers; *s*, the wooden barers; *t*, curb stones; *u*, flag stones. Figure 29 shows a batch of square blocks cemented together, which may be separated singly or in masses, and taken up by melting the surrounding cement. Figure 30 shows a batch of blocks of various sizes and figures, cemented together within a square space, which batch may be removed in a mass when the cement is melted away from the surrounding straight grooves Figure 31, a lever of iron with handle of wood, the iron end to be heated for melting and lifting the cement out of the spaces between the blocks. Figure 32, a plan of a truck carrying a fireplace to give a continued heat to a coulter for ploughing out the cement. Figure 33, longitudinal section of the same; *n*, the coulter made of copper, as transmitting heat more freely than iron, and is not so soon burnt out; *p*, two braces to keep the coulter firmly in its position in the midst of the fire; *q*, a row of blocks, from part of which the cement is supposed to be melted away by the passage of the hot coulter. The parts of the truck are too obvious to need referring to.

And I hereby further declare, in reference to my improvements in railroad and other carriages as hereinbefore stated under my first head, that I am aware that the lifting of a portion of the weight of a horse to ease his labor in descending hills has often heretofore been effected in carts by shifting the body of the cart backwards on the axletree, and in other cases by taking a part of the loading from the front and placing it at the back of the cart. And I am aware, also, that a method of lifting a portion of the weight of a horse for the purpose of enabling him to increase his speed by striking the ground with his feet without pressing much of his weight on them, has already been made public. I therefore disclaim the partial lifting of a horse either on level roads or on declivities. But I claim the right of elevating the horse entirely

off the ground on declivities down which the carriage
122 can run by its own weight, this elevation of the horse being combined with a break to regulate the speed of the descent, or to stop the progress of the vehicle at any part of the declivity, and in combination also with the turning of the hinder axletree of the carriage to make it go in a curvilinear direction, as above particularly described.

And I claim the placing of the axletree and fore wheels forwards near or beyond the front of the carriage in this combination, by which the weight of the carriage is thrown so far behind the horses as to more than counterbalance them when suspended.

And in reference to my second head of improvements, namely, in the wheels of carriages to run on railroads. I am aware of the plan for driving short blocks of wood endwise into a dovetailed groove in the periphery of an iron wheel; and I am aware, also, of an improvement upon this last-mentioned wheel, whereby similar short blocks of wood are described as being held around the periphery of a wheel by a ring screwed on against the sides of the blocks,
123 so as to hold them against the opposite flanch by compression. And I am further aware of a plan, according to which it is proposed to secure a number of short blocks by holding them in a rebate formed in the periphery of the wheels. I therefore disclaim all these plans, together with all methods of securing short blocks to form the outer running surface or peripheries of wheels for being used exclusively on railways. But I claim the right of making railway wheels with pieces of wood extending from the nave or axle to the periphery, the wood being secured together by bolts between cheeks or plates and rings on each side, two examples of which construction are shown at Figures 4, 5, and 6, and at 7 and 8. And I claim the right of bolting or screwing on a ring to form the flanch in any kind of railway wheel, so that the flanch may be replaced by a new one when it is worn out before the rest of the wheel.

And in regard to my third head, or my improvement upon the wheels of carriages to run on carriage roads, I claim the right of constructing the outer part of the felloes of two rings com-
124 posed of short pieces of wood, having the end of the grain standing against the circumference and bolted to and through a middle rib projecting all around from and constituting a part of the inner felloe of iron.

And in regard to my fourth head, namely, the improvement upon the wheels of carriages to run alternately upon common roads and upon railways, I claim the right of combining a rim or tire of iron to run upon a common road with a tire of wood having the grain lying nearly in the direction of the radius, bolted on in short pieces by the side of the iron rim, the external part of the wood which is to run upon the railway being of less diameter than the iron rim which is to run upon the common road.

And in reference to my fifth head, respecting my improvement in railroads, I claim the formation of the rails of hard wood placed

upon the end of the grain in or nearly in a vertical position, and of laying the same in a bed of concrete, of cement, or of gravel.

And in respect of my sixth head, namely, improvements
125 in railways on common roads, I claim the using of tram-rails in cases where carriages are allowed to cross the road and in front of buildings, leading on to edge rails in other parts of the road; and I claim the leading pieces forming the communication between the tram rails and the edge rails; and I claim the nailing down of iron rails through wooden bearers upon bearers of cement or asphalte, with nails having thick points and comparatively thin shanks.

And in regard of my seventh head, or of improvements in railways, and whereas I claim, as my first and second modes, the paving with blocks of wood having the grain inclined to the horizon from about 45° to about 70°, and I claim the dowelling of the blocks together in pairs when slanting or leaning in opposite directions.

And in reference to my third mode, I claim the right of paving with wood having the grain vertical, horizontal, or inclined, in combination with a great number of nails driven into the upper surface to diminish the wear and afford a hold for the horse's feet.

126 And in regard to my fourth mode of paving, I claim the right of making grooves in the sides of blocks and planks, and of placing tongues or keys of any suitable material into the pairs of meeting grooves for preventing either of two contiguous blocks or planks, held by one common tongue, from sinking below or rising above the other.

And according to my fifth mode of paving, I claim the right of cementing blocks or pieces of wood together by filling up the interstices between them with a mixture of earthy matter, united with pitch or other bituminous substance or suitable cement, which will melt with heat and yet remain firm at the highest summer temperature. And I claim the right of using a hot iron lever and a hot iron or copper plough or coulter, attached to a truck, to melt the cement, and of the interstices between the blocks when it is required to take them up for the laying or repairing of water and gas pipes.

And according to my sixth mode of paving, I claim the right
127 of laying upon the natural ground or foundation of the road a layer of sand, ashes, or saw-dust, saturated with tar or other bituminous substance, especially if boiled, for the blocks to rest upon.

And according to my seventh mode, I claim the right of making grooves or furrows in the upper surfaces of wooden pavements, whether the grain be placed in an inclined or in a vertical position.

And finally, according to my eighth mode, I claim the right of laying down concave iron plates upon longitudinal bearers of wood, for forming the gutters of streets, in combination with any kind of pavement; such several parts of my said invention and improvements, so as aforesaid claimed by me, being, to the best of my knowledge, new and not heretofore publicly used; and this specifi-

cation and description being a full compliance with the proviso in the said letters patent contained. I claim exclusive benefit and privilege of these my said inventions and improvements.

In witness whereof, I, the said Thomas Parkin, have hereunto set my hand and seal this Seventh day of October, in the
128 year of our Lord one thousand eight hundred and thirty-nine. THOS. PARKIN. [L. S.]

And be it remembered, that on the seventh day of October, in the year of our Lord 1839, the aforesaid Thomas Parkin, Esquire, came before out said Lady the Queen, in her chancery, and acknowledged the specification aforesaid, and all and everything therein contained and specified, in form above written; and also the specification aforesaid was stamped according to the tenor of the statute made for that purpose.

Inrolled the ninth day of October, in the year of our Lord one thousand eight hundred and thirty-nine.

DUCKWORTH.

129 *Disclaimer.*

In the matter of a patent granted to Thomas Parkin, of Moorgate street, in the city of London, engineer, for the sole making, using, exercising, and vending of his invention of "improvements in railroad and other carriages, in wheels for such carriages, and on roads and ways on which they are to travel," within England and Wales, and the town of Berwick-on-Tweed, bearing date at Westminster, the ninth day of April, one thousand eight hundred and thirty-nine, to which the said Thomas Parkin did duly enrol a specification.

Disclaimer to be entered by the said Thomas Parkin, pursuant to an act passed in the fifth and sixth years of the reign of his late Majesty King William the Fourth, entitled "An act to amend the laws touching letters patent for inventions."

Whereas I, the said Thomas Parkin, in the said specification, described my invention so far as relates to improvements in
130 railroads and other carriages, in manner following, that is to say:

"Firstly. My improvements in railroad and other carriages consist in modifying the carriage, whether wagon or coach, and in combining with the modification an apparatus for lifting the horse or horses entirely off the ground and suspending him or them from the carriage or carriage frame while descending hills, and adding a break to one or two of the wheels to retard the velocity, whereby the carriage may be safely allowed to run down hill by its own gravity at a speed considerably greater than the safety of the horses would otherwise permit, and yet that the carriage may be retarded or stopped at pleasure by means of the break. And, further, in combining with the carriage the means of causing the hinder axletree to turn on a centre pin instead of the fore axle, as in common use for guiding the carriage, and in providing for the fixing of the axletree at right angles to the path of the carriage while running

131 on railways." And whereas, I, in my said specification, also described my improvements in railways on common roads to consist in the laying down of tram rails and edge rails in the same continuous line along the common road amongst other things in combination with a mode of securing both sorts of rails down upon bearers of wood by nails driven through the iron and through the wood, with continuous bearers of asphalte or other suitable cement laid in trenches dug in the road, the points of the nails being made in manner in the said specification mentioned, and being driven in whilst the cement is soft, for the purpose therein also mentioned. And whereas I, in my said specification, also described my improvements in roads and ways to consist, according to my third mode, "in paving with planks or blocks of wood, having the grain lying in any direction, in combination with nails thickly driven into their upper surfaces, the two-fold object of the rails being to diminish, wear, and afford hold for the horses' feet and prevent their slipping,"
132 and according to my fourth mode, "in paving with blocks or planks having the grain lying, standing, or leaning in any direction, in combination with grooves cut as therein mentioned, and in the placing of tongues or keys of any suitable material into each pair of meeting grooves, for the purpose therein mentioned; and, according to my fifth mode, "in paving with blocks or pieces of wood cemented together as therein described." And I, by my said specification, stated that, in order to take up said blocks or batches of blocks for laying gas or water pipes, I provide a lever of iron having a wooden handle, the iron end, being made hot, is thrust down into the insterstices to melt the cement and lift it out, several such levers being heated at one time may be used simultaneously or in rapid succession, so that a block, or batch of blocks, may be quickly separated from those surrounding, and I also provide a plough or coulter of copper or iron for the same purpose, kept hot by a fire made around it, while it is drawn along the insterstices. And whereas
133 and eighth models of improvements in roads and ways to consist, "according to my seventh mode, in cutting furrows or grooves in any direction a few inches apart across the upper surfaces of the blocks of wood used in paving, whether the grain be vertical or inclined to the horizon; but, in case of small blocks being used, the grooves or furrows are formed by chamfering off the outer edges of the upper surfaces of the blocks, which furrows and chamferings may be made deep and filled up with asphalte or other cement or gravel or sand, the object being, in both cases, to prevent the horses feet slipping." And, according to my eighth mode, "in laying down on the sides of streets concave plates of iron screwed or nailed down upon longitudinal bearers of wood sunk at a proper depth below the roadway" And whereas, I, by my said specification in reference to my improvements in railroad and other carriages, claimed the right of lifting the horse entirely off the ground, on declivities down which the carriage can run by its own weight, this elevation of the horse being combined with a
134 break to regulate the speed of the descent, or to stop the progress of the vehicle at any part of the declivity, and in com-

bination also with the turning of the hinder axletree of the carriage to make it go in a curvilinear direction, as above particularly described, and the placing of the axletree, and forewheels forwards, or beyond the front of the carriage in the combination, by which the weight of the carriage is thrown so far behind the horses as to more than counterbalance them when suspended. And whereas by my said specification in reference to my improvements in railways in common roads, I claimed the nailing down of iron rails through wooden bearers through cement or asphalte, with nails formed as therein mentioned; and whereas I also, in reference to my third mode, claimed the right of paving with wood, having the grain vertical, horizontal, or inclined in combination with a great number of nails driven into the uper surface to diminish the wear and afford a hold for the horses feet; and, in reference to my fourth mode, the right of making grooves cut in the sides of blocks
135 and planks, and of placing tongues or keys of any suitable material into the pairs of meeting grooves for preventing either of two contiguous blocks or planks held by one common tongue from sinking below or rising above the other; and in reference to my fifth mode of paving, I, amongst other things, claimed the right of using a hot iron lever, and a hot iron or copper plough or coulter attached to a trunk, to melt the cement out of the interstices between the blocks when it is required to take them up for the laying or repairing the gas or water pipes; and, according to my seventh mode of paving, I claimed the right of making grooves or furrows in the upper surfaces of wooden pavement, whether the grain be placed in an inclined or in a vertical position; and, finally, according to my eighth mode, I claim the right of laying down concave iron plates upon longitudinal bearers of wood for forming the gutters of streets in combination with any kind of pavement. Now, therefore, I do hereby wholly disclaim so much of the title of my said invention, and of the said specification to my said patent, and of any right thereby claimed, as relates to improvements in railroad and other carriages, including the mode of
136 litting the horse set forth in my said specification; and I do hereby further disclaim, in reference to my improvements in railways on common roads, by laying down tram rails and edge rails in the same continuous line as in my said specification and hereinbefore set forth, all right to the mode of securing both or either of the said sorts of rails down upon bearers of wood by nails driven through the iron and through the wood, with continuous bearers of asphalte or other suitable cement in manner in the said specification mentioned, or otherwise; and I do hereby further wholly disclaim all right to my third mode of improvements in roads and ways in the said specification mentioned; and I do hereby further disclaim, in reference to my fourth mode of improvements in roads and ways, all right of paving with planks of wood, and also of making grooves cut in the sides of any planks, and of placing tongues or keys in manner in the said specification mentioned in grooves cut in planks. And I do hereby further disclaim in reference to my fifth mode of improvements in roads and ways all right to the use of any

such lever or coulter as is described and claimed by my said specification.

And I do hereby also wholly disclaim all right to the seventh and eighth modes of improvements in roads and ways respectively in my said specification mentioned.

In witness whereof, I, the said Thomas Parkin, have hereunto set my hand, this tenth day of April, one thousand eight hundred and forty.

THOS. PARKIN.

To the clerk of the patents of England:

This is to certify that the before-mentioned Thomas Parkin, of Moorgate street, in the city of London, has applied to me for leave to enter with you the above written disclaimer of part of the title and of the specification of a certain invention for which letters patent were duly granted to him under the great seal, dated at Westminster the ninth day of April, one thousand eight hundred and thirty-nine, and the specification of which was enrolled on the ninth day of October, 1839; and, on considering of the said application, I directed him to advertize his said disclaimer in the London Gazette, and in the Times and Morning Herald and Morning Chronicle newspapers, and such advertisements have been duly made in the said Gazette on the fourteenth day of April, and in the Times, Morning Herald, and Morning Chronicle on the fifteenth day of the same month, 1840, and no valid objection having been made to the said application, I have accordingly granted leave to the said Thomas Parkin to file his said disclaimer pursuant to the statute passed in the sixth year of the reign of his late Majesty King William the Fourth, entitled "An act to amend the law touching letters patent for inventions."

THOS. WILDE,
Sergeants' Inn Temple.

April 6th, 1841.

And be it remembered, that on the twenty-sixth day of April, in the year of our Lord 1841, the aforesaid Thomas Parkin came before our said Lady the Queen, in her chancery, and acknowledged the disclaimer aforesaid, and all and everything therein contained and specified, in form above written; and also the disclaimer aforesaid was stamped according to the tenor of the statute made for that purpose.

Enrolled the twenty-seventh day of April, in the year of our Lord one thousand eight hundred and forty-one.

SENIOR.

Disclaimer and Memorandum of Alteration.

To all to whom these presents shall come: I, Thomas Harper Bennett, of the Dover road, in the county of Surrey, hat and cap manufacturer, send greeting:

Whereas, Her most excellent Majesty Queen Victoria, by her letters patent under the great seal of Great Britain, bearing date at

Westminster the ninth day of April, in the second year of her reign, did, for herself, her heirs, and successors, give and grant unto one Thomas Parkin, his ex'ors, adm'ors, and assigns, her special license, full power, sole privilege, and authority that the said Thomas Parkin, his ex'ors, adm'ors, or assigns, or such others as he, the said Thomas Parkin, should at any time agree with, and no others, from time to time and at all times thereafter during the term of years therein expressed, should and lawfully might make, use, exercise, and vend within that part of the United Kingdom of Great Britain and Ireland, called England, her dominion of Wales, and her town of Berwick-upon-Tweed, his invention of "improvements in
141 railroad and other carriages, in wheels for such carriages, and in roads and ways on which they are to travel": And whereas the said Thomas Parkin, in pursuance of a proviso in the said in part recited letters patent contained, did cause a particular description of the nature of his said invention, and in what manner the same is to be performed, by an instrument in writing under his hand and seal, to be inrolled in her said majesty's High Court of Chancery on the ninth day of October, in the year of our Lord one thousand eight hundred and thirty-nine: And whereas the said Thomas Parkin, after the granting the said letters patent the sixth day of April, in the year of our Lord one thousand eight hundred and forty-one, applied to Sir Thomas Wild, knight, then being attorney-general for her present majesty Queen Victoria, for leave to enter with the clerk of the patents of England a disclaimer, bearing date the tenth day of April, in the year of our Lord one thousand eight hundred and forty, by him, the said Thomas Parkin, and under the hand of him, the said Thomas
142 Parkin, and of part of the title of the specification of the said invention for which the said letters patent were granted as aforesaid; and the said Sir Thomas Wilde, attorney general aforesaid, under his hand in writing, on the said sixth of April, one thousand eight hundred and forty-one, on such application duly granted leave to the said Thomas Parkin to file his said disclaimer, pursuant to the statute passed in the sixth year of the reign of his late Majesty King William the Fourth, entitled "an act to amend the law touching letters patent for inventions," and thereupon the said Thomas Parkin, according to the said leave so granted, afterwards, on the Twenty-sixth day of April, in the year of our Lord, one thousand eight hundred and forty-one, at the Patent Office, Quality Court, Chancery Lane, duly filed the said disclaimer, bearing date the tenth day of April, one thousand eight hundred and forty aforesaid, and the said disclaimer was then, on the said twenty-sixth day of April, in the year of our Lord one thousand eight hundred and forty-one, taken and acknowledged by the said Thomas Parkin, and which said disclaimer, leave,
143 and acknowledgement aforesaid were afterwards, on the twenty-seventh day of April, one thousand eight hundred and forty-one, duly enrolled in chancery of record: And whereas, by a certain indenture of assignment, bearing date on or about the tenth day of June, in the year of our Lord, one thousand eight

11-604

hundred and forty-two, made between the said Thomas Parkin of the one part, and me, the said Thomas Harper Bennett, of the other part, the said letters patent were, for the considerations in the said indenture mentioned, assigned, transferred, and set over unto me, the said Thomas Harper Bennett, my ex'ors, adm'ors, and asssigns: And whereas I, the said Thomas Harper Bennett, am desirous, for good and sufficient reasans hereinafter mentioned, to enter a disclaimer of that part of the title of the said invention hereinafter next mentioned, and of the said specification and memorandum of alteration in title in the said specification, and have obtained leave of Her Majes'y's attorney general, certified by his fiat and signature, according to the form of the statute in such case made and provided.

144 Know ye therefore, that I, the said Thomas Harper Bennett, being possessed of the said letters patent under and by virtue of the said assignment thereof to me as aforesaid, do hereby for the reason of making the title of the said invention consistent with the disclaimer and memorandum of alteration, hereby by me made and applicable to the said invention, only remaining undisclaimed and in force and effect after the making of this my disclaimer and memorandum of alteration, enter my disclaimer, and do hereby disclaim the following part of the title of the said invention; that is to say, I hereby disclaim the words "in railroad and other carriages, in wheels for such carriages, and;" also the words "on which they are to travel." And I, the said Thomas Harper Bennett, do hereby, for the reason aforesaid, enter my memorandum of alteration, and I do hereby, for the reason aforesaid, alter the said title of the said invention of "improvements in railroad and other carriages, in wheels for such carriages, and in roads and ways on which they are to travel," by striking out the words "in railroad and other carriages, in wheels for such carriages, and on which they are to travel," and by adding after the words in the

145 said title "in roads and ways," the words following, viz: "made or paved with wood on which carriages are to travel," so that after the said disclaimer and alteration, the title of the said invention will be and now is, invention of "improvements in roads and ways made or paved with wood on which carriages are to travel." And also I do hereby, for the reason aforesaid, disclaim and alter the said specification in the recital therein of the said letters patent, by stating the title of the said letters patent as so disclaimed and altered as aforesaid, instead of the title of the said patent before the same was disclaimed and altered; and also that I hereby further disclaim, on the ground and for the reason of want of novelty, the right of elevating the horse entirely off the ground on declivities down which the carriage can run by its own weight, the elevation of the horse being combined with a break to regulate the speed of the descent, or to stop the progress of the vehicle at any part of the declivity, and in combination also with the turning of the hinder axle-tree of the carriage to make it go in a curvilinear direction, as in the the said specification mentioned, and all right and

146 claim thereto and every part thereof, and all words

in the said specification relating thereto. And I further hereby disclaim, on the ground of want of novelty, the placing of the axle-tree and fore wheels forwards, near, or beyond the front of the carriage in the combination, by which the weight of the carriage is thrown so far behind the horses as to more than counter-balance them when suspended, as in the specification mentioned, and all right and claim thereto, and all and every part thereof. And I further hereby disclaim, on the ground and for the reason of want of novelty, the right of making railway wheels with pieces of wood extending from the nave or axle to the periphery, the wood being secured together by bolts between cheeks or plates and rings on each side, two examples of which construction are shewn at 4, 5, and 6, and 7 and 8 as in the specification mentioned and all right and claim thereto, and all and every part thereof. And I further hereby disclaim, on the ground and for the reason of want of novelty, the right of bolting or screwing on a ring to form the flanch in any kind of railway wheel, so that the flanch may be replaced by a new one when it is worn out before the rest
147 of the wheel, as in the said specification mentioned, and all right and claim thereto, and all and every part thereof.

And in regard of the third head or improvement upon the wheels of carriages to run upon common roads, I hereby further disclaim, on the ground and for the reason of want of novelty, the right of constructing the outer part of the felloe of two rings composed of short pieces of wood, having the end of the grain standing against the circumference, and bolted to and through a middle rib projecting all around from and constituting part of the inner felloe of iron, as in the said specification mentioned, and all right and claim thereto, and all and every part thereof.

And in regard to the fourth head, namely, the improvement upon the wheels of carriages to run alternately upon common roads and upon railways, I further hereby disclaim, on the ground and for the reason of want of novelty, the right of combining a rim or tire of iron to run upon a common road with a tire of wood, having the grain lying nearly in the direction of the radius, bolted on in short pieces
148 by the side of the iron rim, the external part of the wood which is to run upon the railway being of less diameter than the irong ring which is to run upon the common road, as in the said specification mentioned, and all right and claim thereto, and to all and every part thereof.

And in reference to the fifth head respecting the improvements in railroads, I further hereby disclaim, on the ground and for the reason of want of novelty, the formation of the rails of hard wood placed with the end of the grain in or nearly in a vertical position, and of laying the same in a bed of concrete, of cement, or of gravel, as in the said specification mentioned, and all and every part thereof.

And in respect of the sixth head, namely, improvements in railroads on common roads, I hereby further disclaim, on the ground and for the reason of want of novelty, the using of tram rails in cases where carriages are allowed to cross the road and in front of

buildings leading on to edge rails in other parts of the road, as in the said specification mentioned, and all right and claim thereto, and to all and every part thereof; and I further hereby
149 disclaim on the ground and for the reason of want of novelty, the leading pieces forming the communication between the tram rails and the edge rails as in the said specification mentioned, and all right and claim thereto, and to all and every part thereof; and I hereby further disclaim on the ground and for the reason of want of novelty, the nailing down of iron rails through wooden bearers upon bearers of cement or asphalte, with nails having thick points and comparatively thin shanks as in the said specification mentioned, and all right and claim thereto, and to all and every thereof.

And in the seventh head of improvements in roads and ways in the said specification mentioned, as well in the descriptive part as in the claiming part thereof, I hereby, for the reason of precision and certainty, do disclaim in the words of the said seventh head of improvements in the said descriptive part of the said specification following; that is to say, "in paving them with blocks of wood having the grain inclined to the horizon in some angle varying from about forty-five degrees to about seventy degrees,"
150 the word "about," where it is used respectively before the words "forty-five degrees," and also before the words "seventy degrees," thus making the words to run "varying from forty-five to seventy degrees;" and in the words of the said seventh head in the claiming part of said specification following; that is to say, having the grain inclined to the horizon from about forty-five degrees to about seventy degrees, the word "about," where it is used respectively before the words "forty-five degrees," and also before the words "seventy degrees," thus making the words to run "inclined to the horizon from forty-five degrees to seventy degrees;" and I recommend dowelling as in the said specification mentioned, yet I hereby disclaim, on the ground and for the reason of want of novelty, the dowelling of the blocks together in pairs when slanting or leaning in opposite directions, as in my said specification mentioned, and all right and claim thereto. And I further hereby disclaim, on the ground and for the reason of want of novelty, the right of paving with wood having the grain vertical, horizontal, or
151 inclined, in combination with a great number of nails driven into the upper surface to diminish the wear and afford a hold for the horses' feet, as in the said specification mentioned, and all right and claim thereto, and to all and every part thereof. And I do hereby, for the reason and on the ground of want of novelty, further disclaim in reference to the fourth mode of improvements in roads and ways, all right of making grooves cut in the sides of any planks, and of placing tongues or keys in manner in the said specification mentioned, in grooves cut in planks, and all claim thereto.

And I hereby further disclaim, on the ground and for the reason of want of novelty, the right of cementing blocks or pieces of wood together by filling up the interstices between them with a mixture

of earthy matter united with pitch or other bituminous substance or suitable cement, which will melt with heat and yet remain firm at the highest summer temperature, as in the said specification mentioned, and all right and claim thereto, and to all and every part thereof.

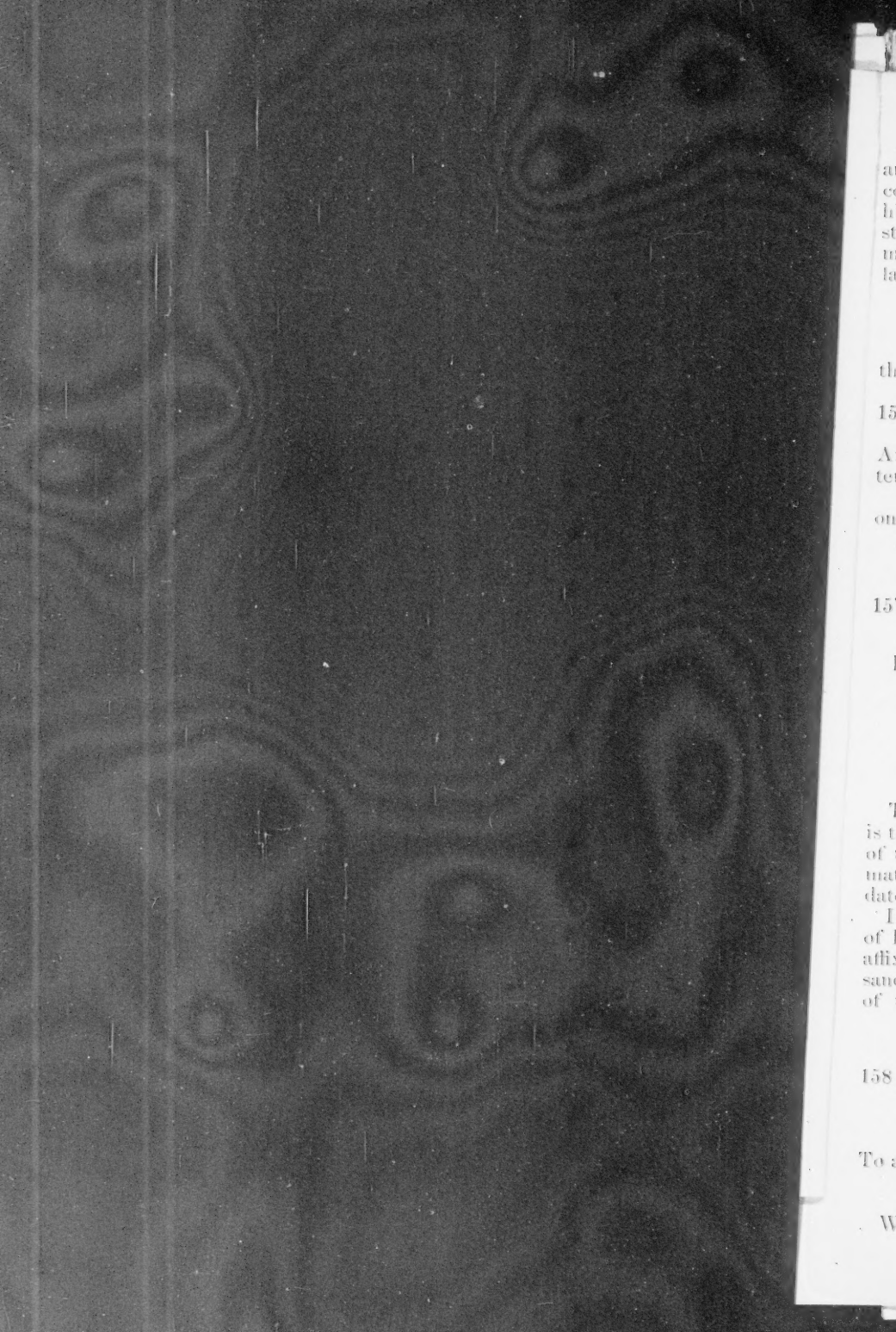
And I hereby further disclaim, on the ground and for the reason of want of novelty, the right of using a hot iron lever and a
152 hot iron or copper plough or coulter attached to a truck to melt the cement out of the interstices between the blocks, when it is required to take them up for the laying or repairing of water and gas pipes, as in the said specification mentioned, and all right and claim thereto, and to all and every part thereof. And I hereby further disclaim, on the ground and for the reason of want of novelty, the right of laying upon the natural ground or foundation of the road a layer of sand, ashes, or saw-dust, saturated with tar or other bituminous substance, especially if boiled, for the blocks to rest upon, as in the said specification mentioned, and all right and claim thereto, and to all and every part thereof. And I hereby further disclaim, on the ground and for the reason of want of novelty, the right of making grooves or furrows in the upper surfaces of wood or pavement, whether the grain be placed in an inclined or in a vertical position, as in the said specification mentioned, and all right and claim thereto, and to all and every part thereof. And I hereby further disclaim, on the ground and for the reason of want of novelty, the right of laying down concave iron plates
153 upon longitudinal bearers of wood for forming the gutters of streets in combination with any kind of pavement, as in the said specification mentioned, and all right and claim thereto, and to all and every part thereof. And I, the said Thomas Harper Bennett, do also hereby declare that my reasons for making and entering the above disclaimer and memorandum of alteration are the reasons above by me stated. And I, the said Thomas Harper Bennett, do hereby further declare that the above disclaimer and memorandum of alteration are not, nor is either of them or any part thereof, such disclaimer or alteration as will extend the right granted by the said letters patent.

In witness whereof, I have hereunto set my hand seal, this nineteenth day of July, in the year of our Lord one thousand eight hundred and forty-three.

THOMAS HARPER BENNETT. [L. S.]

To the clerk of the patents of England:

This is to certify that the above named Thomas Harper Bennett, of the Dover road, in the county of Surry, hat and cap manufacturer, has applied to me for leave to enter with you the above written
154 disclaimer or memorandum of alteration of part of the title and specification of a certain invention for which letters patent were granted to the above-named Thomas Parkin, under the great seal of Great Britain, dated at Westminster, the ninth day of April, one thousand eight hundred and thirty-nine, and to which a specification was duly enrolled; and having considered of the said application,



and no valid objection having been made to the same, I have accordingly granted leave to the said Thomas Harper Bennett to file his said disclaimer and memorandum of alteration, pursuant to the statute passed in the fifth and sixth years of the reign of his late majesty King William the Fourth, entitled an act to amend the law touching letters patent for inventions."

FRED. POLLOCK.

TEMPLE, *July 19th*, 1843.

And be it remembered, that on the twenty-first day of July, in the year of our Lord 1843, the aforesaid Thomas Harper Bennett came before our said lady the Queen, in her chancery, and
155 acknowledged the disclaimer aforesaid, and all and everything therein contained and specified in form above written. And also the disclaimer aforesaid was stamped according to the tenor of the statute made for that purpose.

Enrolled the twenty-fourth day of July, in the year of our Lord one thousand eight hundred and forty-three.

Ex'd.—E. A. M. DUCKWORTH.

(Here follows diagram, marked page 156.)

157 K.

ROBERT C. PHILLIPS *et al. vs.* THE CITY OF DETROIT.

Exhibit K, referred to in stipulation of April 10, 1878.

D. C. HOLBROOK,
Sol'r for Def't.
GEO. H. LOTHROP,
Sol'r for Compl't.

Department of the Interior, United States Patent Office.

To all persons to whom these presents shall come, greeting: This is to certify that the annexed is a true copy from the bound volumes of the library of this office, of the specification and drawing, in matter of the English letters patent, granted Thomas Wood, Jr., dated October 7, 1840, No. 8657.

In testimony whereof, I, W. H. Doolittle, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed, this fourth day of August, in the year of our Lord one thousand eight hundred and seventy-seven, and of the Independence of the United States the one hundred and second.

[SEAL.] W. H. DOOLITTLE,
Acting Commissioner.

158 A. D. 1840. No. 8657.

Blocks for Paving.

Wood's Specification.

To all to whom these presents shall come, I, Thomas Wood, the younger, of the Wandsworth Road, in the parish of Clapham, in the county of Surrey, gentleman, send greeting:

Whereas Her Most Excellent Majesty, Queen Victoria, by her let-

ters patent, under the great seal of the United Kingdom of Great Britain and Ireland, bearing date at Westminster, the seventh day of October, in the fourth year of her reign, did for herself, her heirs, and successors, give and grant unto me, the said Thomas Wood, the younger, her especial license that I, the said Thomas Wood, the younger, my ex'ors, adm'ors, and *and* assigns, or such others as I, the said Thomas Wood, the younger, my ex'ors, adm'ors, and assigns, should at any time agree with, and no others, from time to time and at all times during the term of years therein expressed, should, and lawfully might make, use, exercise, and vend within England,
Wales, and the town of Berwick-upon-Tweed my "improve-
159 ments in paving streets, roads, bridges, squares, paths, and
such like ways," in which said letters patent there is contained a proviso obliging me, the said Thomas Wood, the younger, by an instrument in writing, under my hand and seal, particularly to describe and ascertain the nature of my said invention, and in what manner the same is to be performed, and cause the same to be enrolled in her Majesty's High Court of Chancery within six calendar months next and immediately after the date of the said recited letters patent, as in and by the same, reference being thereunto had, will more fully and at large appear.

Now know ye, that in compliance with the said proviso, I, the said Thomas Wood, the younger, do hereby declare that the nature of my said invention, and the manner in which the same is to be performed, are described and ascertained by the drawings in the margin hereof, and the words following (that is to say):

The blocks I use for paving are of two forms, viz.: The section of the pyramid having either a square base (Fig. A), or an elongated
base (Fig. B), and the double wedge cut from either a similar
160 square base (Fig. C), or a similar elongated base (Fig D). I
confine myself to no particular dimensions for the blocks, neither to any particular angle, only the sections of pyramids and the double wedges must all be cut at the same angle.

The most advantageous angles at which to cut or mould the blocks range from 70 to 88 and ½ degrees.

I do not confine myself to any particular substance or material for the blocks. They may be of stone, wood, or any other substance or material suitable for pavings.

The particular construction, combination, or arrangement I adopt is as follows: I dispose the block so that every other block in one series of blocks, is the section of the pyramid standing on its smaller end (Fig. E.), and every other block in another series of blocks is the section of the pyramid standing on its base, (Fig. F). The intervening blocks of both series (*a*, *a*, *a*, *a*, *a*) are the double wedges, which, from their peculiar form, combine equally well with the sections of pyramids, whether these latter be placed on their
smaller end or on their base; and a number of such alternate
161 series of blocks being placed across a road, all the blocks are
made to lean and press on each other on all sides, in mutual support, (Fig. G). The half blocks *b*, *b*, *b*, *b*, *b*, are introduced to break joint. In putting down this pavement I leave those series of

blocks which have the bases of the sections of pyramids upwaads a little elevated, say half an inch, more or less, above the other series which have the bases of the sections of pyramids downwards. When the whole space to be paved is covered to the abutments (viz, curb stones, walls, or other usual and secure boundaries), with blocks put closely together, as described above, I then drive those series which were left elevated down to the general level, taking care, moreover, to drive those blocks which are sections of pyramids, with their bases upwards last. In this manner I can wedge the road together with any degree of intensity so as to prevent all displacement, and give it a complete firmness and solidity even when put down on a foundation of mere shingle, gravel, or sand. Those blocks, which are sections of pyramids with the bases upwards, being drawn, the road is unlocked, and may be taken
162 up in whole or in part, I sometimes adopt modifications of the above construction of pavement.

The first modification (Fig. H) has two-fold advantage of affording a secure foot hold to horses, and of throwing the weight and pressure of the traffic on those blocks, which, (being the sections of pyramids with the bases upwards), when pressed or driven, tend to consolidate the road. This is effected by making those blocks taller than the rest, say half an inch, more or less.

The second modification (Fig. I) takes the weight and pressure of the traffic off those blocks, which, by their form and position, sustain the blocks around them, and in consequence here again the very traffic tends to consolidate the road. This is effected by making those blocks, which are the sections of the pyramids standing on their bases, somewhat shorter than the rest, say half an inch, more or less.

The third modification (Fig. K) has the two-fold advantage of affording a secure foot hold to horses, especially on an inclined plane, and of throwing the whole weight and pressure of the
163 traffic on those blocks, which, (having the larger surface upwards), on being pressed or driven, tend to consolidate the road. This is effected by making those series somewhat taller than the rest, say half an inch, more or less.

I sometimes make those series considerably taller, say from one inch to three inches, more or less, and I then fill in the spaces *c*, *c*, *c*, *c*, between the alternate series with concrete, or coal tar, asphalt, or other bituminous substance, heated and mixed with gravel, sand, or such like material.

I do not claim as my invention, the two forms of blocks which I have described as above, and which I use in my method of paving, because they are mathematical forms, and are known to scientific men in general. But I claim, as my invention, the peculiar combination, construction, or arrangement of blocks of those forms, which I have specified and described herein.

And I claim likewise, as my invention, the modifications of that peculiar combination, construction, or arrangement, which modifications I have also specified and described herein.

164 In witness whereof I, the said Thomas Wood the younger,

have hereunto set my hand and seal the thirtieth day of March, in the year one thousand eight hundred and forty-one.

THO. WOOD, JUN'R. [L. S.]

And be it remembered, that on the thirtieth day of March, in the year of our Lord 1841, the aforesaid Thomas Wood the younger, came before our said Lady the Queen, in her chancery, and acknowledged the specification aforesaid, and all and everything therein contained and specified in form above written. And also the specification aforesaid was stamped according to the tenor of the statute made for that purpose.

Inrolled the second day of April, in the year of our Lord one thousand eight hundred and forty-one.

Ex'd.—E. A. M., E. H. R. FARRER.

(Here follows diagram, marked p. 165.)

166 N.

ROBERT C. PHILLIPS *et al. vs.* THE CITY OF DETROIT.

Exhibit "N." GEO. H. LOTHROP, *for Compl't.*
D. C. HOLBROOK, *for Def't.*

Department of the Interior, U. S. Patent Office.

To all persons to whom these presents shall come greeting:

This is to certify that the annexed is a true copy from the bound volumes of the library of this office of the specification and drawing in the matter of English letters-patent granted John James Alexander MacCarthy, dated November 10th, 1825, No. 5287.

In testimony whereof, I, W. H. Doolittle, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this twentieth day of October, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundred and first.

[SEAL.] W. H. DOOLITTLE,
Acting Commissioner.

167 *McCarthy's Specification.*

To all to whom these presents shall come, I, John James Alexander MacCarthy, late of Pall Mall Place, in the Parish of Saint James, in the city of Westminster, but now of No. 6 Polygon Buildings, in the Parish of Clapham, in the county of Surrey, send greeting:

Whereas his present Majesty King George the Fourth, in and by his letters patent, under the great seal of Great Britain, bearing date at Westminster, the tenth day of November, in the sixth year of his reign, for himself, his heirs, and successors, did give and grant unto me, the said John James Alexander MacCarthy, my executors, administrators, and assigns, his special licence, full power, sole privilege and authority, that I, the said John James Alexander

11-604

MacCarthy, my executors, administrators, and assigns, and every of them, by myself and themselves, or by my and their deputy or deputies, servants or agents, or such others as I, the said John James Alexander MacCarthy, my executors, administrators, or assigns, should at any time agree with, and no others, from
168 time to time, and at all times thereafter during the term of years therein expressed, should and lawfully might make, use, exercise, and vend, within England and Wales and the town of Berwick-upon-Tweed, my invention of "A new or improved pavement, pitching, or covering for streets, roads, ways, and places;" in which said letters patent there is contained a proviso obliging me, the said John James Alexander MacCarthy, by an instrument in writing, under my hand and seal, particularly to describe and ascertain the nature of my said invention, and in what manner the same is to be performed, and to cause the same to be inrolled in His Majesty's high court of chancery within six calendar months next and immediately after the date of the said recited letters patent, as in and by the same, reference being thereunto had, will more fully appear.

Now know ye, that in compliance witth the said proviso, I, the said John James Alexander MacCarthy, do hereby describe and ascertain the nature of my said invention, and in what manner the same is to be performed by the drawings in the margin of
169 these presents, and the following description thereof, that is to say:

Stone or any other material or materials, whether natural or artificial, and of any adequate size, is formed into a block, solid or otherwise, plane on the upper and under surfaces, the same block having on one side, or on one end or one side and on one end, one or more projecting or protruding tooth or teeth, tenon or tenons, angle or angles, portion or portions of a circle or of an elipsis, and having on another side, or on another end, or on another side and on another end, one or more indented or receding socket or sockets, or mortice or mortices, or angle or angles, or portion or portions of a circle or of an elipsis, such several angles to be right, or more or less acute or obtuse, as it may be deemed convenient. The blocks of one or any of the forms above described are laid upon the place intended to be paved or covered, contiguous to, or adjoining, or fitted to each other cross-jointed to check each other; that is to say, the projecting or protruding tooth or teeth, tenon or tenons, angle or angles, portion or portions of a
170 circle or of an elipsis of one or more block or blocks, is or are inserted in or joined to the indented or receding socket or sockets, or motice or mortices, or angle or angles, or portion or portions of a circle, or of an elipsis of another block or of other blocks cross-jointed, to check each other bondwise, as is observed in laying down brick and other pavements, and each block is placed or laid in such manner as that each is supported by each, until the space intended to be paved shall be paved or covered with blocks formed as aforesaid. Cement, gravel, sand, or other materials may or may not be interposed between each block, but I prefer not to use either.

Figure 1 shows the form of stone or of other material which I prefer using.

Figure 2, a superficial view of the pavement or covering, the side A describing a sectional view.

Figure 3, views of the ends of stones or other material of the form I prefer using.

Figure 4, represents the form of an instrument by which, with a lever, any part of the pavement or covering may be lifted, as hereinafter mentioned.

When it shall be required to unpave or uncover a street,
171 road, way, or place, or part of a street, road, way, or, place, paved or covered with stone or other material as aforesaid, having a projecting or protruding tooth or tenon or angle, or portion of a circle or of an elipsis, on one side or one end only (and not on one side and on one end also), and having on another side or on another end an indented or receding socket or mortice or angle, or portion of a circle or of an elipsis, then the point of the lifting iron is to be placed between the ends or the sides, as the case may require, of the stones or of other material, as near as is convenient to the portion intended to — raised. The link (*a*), Fig 4, at the top of the lifting iron, being let down, the iron is then driven downwards with a beetle or mallet at (*b*) as far as the collar or stop ring (*c*); the iron is then to be turned on its point (*f*) by the cross handle (*d*), or with a lever passed through the link (*a*) until the spur (*e*) comes beneath the stone or other material intended to be raised, and then, by the means of the lever (*g*), figure 5, passes through the link (*d*), figure 4, the stone or other material (*h*), figure 6, will be raised as is represented in figure 6, when it shall be re-
172 quired to unpave or uncover a street, road, way, or place paved or covered with stone or other material as aforesaid, having on one side and on one end a projecting or protruding tooth or tenon or angle, or portion of a circle or of an elipsis, and having on another side and on another end an indented or receding socket or mortice or angle, or portion of a circle or of an elipsis, then the pavement or covering must be removed by an iron lever or crowbar being applied to or under the pavement or covering, commencing at the outward edge thereof.

In witness whereof, I have hereunto set my hand and seal this ninth day of May, in the year of our Lord one thousand eight hundrd and twenty-six. J. J. A. MacCARTHY. [L. s.]

And be it remembered, that on the same ninth day of May, in the year above mentioned, the aforesaid, John James Alexander MacCarthy, came before our Lord the King in his chancery, and acknowledged the specification aforesaid, and all and everything therein contained in form above written. And also the specification aforesaid was stamped according to the tenor of the
173 statute in that case made and provided.

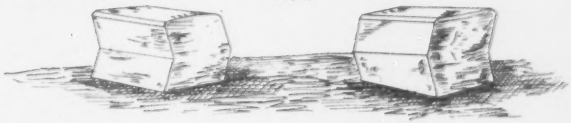
Inrolled the same ninth day of May, in the year above written. Ex. J. A. W. J. J. HARVEY.

(Here follows diagram marked page 174.)

A.D. 1825 Nov. 10. N° 5287.
MAC CARTHY'S SPECIFICATION.

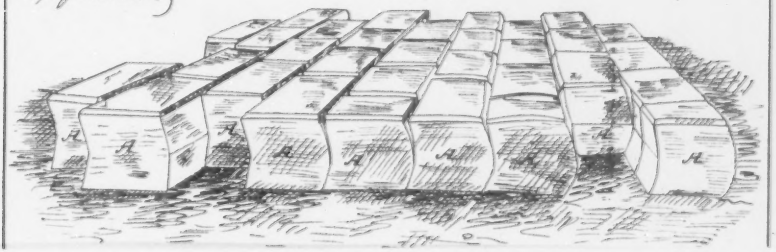
(1 SHEET)

FIG. 1.



No. 3415.
Phillips et al vs.
Cox.
City of Detroit
page 144.

FIG. 2.



(Here follows diagram marked page 174.)

11-604

SUPREME COURT U.S.
FILED
APR 7 1884
JAMES H. McKENNEY, Clerk.

IN THE

SUPREME COURT

OF THE

UNITED STATES.

J. HOWARD PHILLIPS, *Executor, et al.*,
vs.
THE CITY OF DETROIT.

No. 345.

Brief for Appellants.

GEO. GARTNER,
GEO. H. LOTHROP,
Counsel for Appellants.

DETROIT:
JOHN F. EBY & CO., BOOK AND JOB PRINTERS.
1884.

SUPREME COURT

OF THE UNITED STATES.

October Term, 1883.

J. HOWARD PHILLIPS and GARRETSON TOMPKINS, Executors of ROBERT C. PHILLIPS, deceased, EUGENE ROBINSON, and JESSE H. FARWELL, *Appellants*,

vs.

THE CITY OF DETROIT, *Appellee*.

No. 347.

BRIEF FOR APPELLANTS.

STATEMENT OF CASE.

Appellants filed their bill in the court below against the appellee, for infringement of letters patent No. 121,544, granted to Robert C. Phillips for a wooden pavement, December 5th, 1871.

Appellants Robinson and Farwell were joined as exclusive licensees, under the patent, for Michigan.

The appellee admitted infringement, but denied the validity of the patent.

Proofs were taken, and on final hearing the bill was dismissed.

Since the appeal Mr. Phillips has died, and his executors have been substituted.

The error assigned is that the court erred in holding that the patent sued upon does not, in view of the state of the art, disclose any patentable invention.

The defenses urged below were that the patent is void upon its face by reason of the disclaimer therein contained, and that it is void for want of novelty.

I.

Does the disclaimer therein contained render the patent void?

This can only be answered from an examination of the patent.

COMPLAINANTS' PATENT.

The specification describes the patentee's invention as consisting in a pavement made up of wooden blocks in their natural (round) shape, the bark only being removed, a bed composed of broken stone, gravel or sand, or a mixture of these, and a filling of gravel or sand between the blocks.

The novelty of any of these elements, separately considered, is disclaimed.

The claim of the patent is for an entire combination or pavement, consisting of three elements, viz:

1. Blocks of wood in their natural state, the bark being removed, with the fibre vertical.

2. A foundation of broken stone, gravel or sand, or either of them.

3. Something to lock the blocks in position, consisting of a gravel or sand filling.

The entirety is to be compacted by ramming, rolling or other method.

The disclaimer in the patent specification is as follows:

"I do not claim broadly the use of wooden blocks in the state in which they are cut from the tree or branches; nor yet do I claim the foundation of stone or gravel, and the filling of the spaces between the blocks with sand or gravel, separately considered."

A claim for any one, or even two, of these elements might be bad, as not covering a complete and operative combination.

The whole aim of the patent is to cover a *pavement* as a whole, not any one part of a pavement.

But, conceding that all of these elements separately are old, the validity of the patent is not necessarily affected thereby.

"Though it may be true that every one of these elements had been employed before in one kind of pavement or another, yet they had never been used in the same combination and put together in the same manner as Nicolson combined and arranged them, so as to make a pavement like his."

Elizabeth vs. Pavement Co., 97 U. S., 130.

So that the novelty of any element is immaterial, provided the combination, or entire pavement, be new.

On the face of the papers, therefore, the patent is good, and the first defense fails.

II.

WANT OF NOVELTY.

This defence is based upon United States and English patents, and alleged prior public use.

Complainants' patent bears date 5th December, 1871.

Complainants prove by John H. Lawrence, a paving contractor in Cincinnati, that Mr. Phillips made his invention and reduced it to practice as early as June or July, 1869.

Record, pp. 92 and 94, Q. 3.

This is not disputed.

A patent, printed publication, or public use, must therefore be earlier than July, 1869, to anticipate this patent.

Bates v. Coe, 98 U. S., 31.

This disposes of the following patents set up by defendant:

Gardner Warren, 19 October, 1869, No. 96,062.

D. C. Colby, 22 March, 1870, No. 101,000.

Tallmadge E. Brown, 5 April, 1870, No. 101,590.

Certain rejected applications for United States patents are also set up, but these are immaterial.

Brown v. Selby, 23 Wall., 181.

This leaves in the case a number of American and English patents, which I will consider in their order.

ENGLISH PATENTS.

John Lindsay, No. 5,185, 1825.

This is a stone pavement.

The main blocks are wedge-shaped, set with the smaller ends up, and the spaces filled with smaller wedge-shaped stones, in the reverse position, with fine gravel or grout worked between them.

A foundation similar to the pavement, covered with broken granite, is recommended.

McCarthy, No. 5,287, 1825.

Stone or other blocks, plane on the ends and upper and lower surfaces. One side concave and the other convex, to lock the blocks firmly together.

David Stead, No. 7,645, 1838.

Hexagonal, square or triangular wooden blocks, locked together by dowel pins, "driving each block up to those against which it is to rest."

A "sand or other fine filling" is mentioned, but it is difficult to see how it could be used between blocks in contact.

These patents were not relied upon at the hearing below, and are so clearly immaterial that they need little discussion here.

Parkin, No. 8,026, 1839.

Among the numerous devices shown in this patent, is one, figure 30, which is urged in this case.

The description of this mode of paving found in the patent is as follows:

"And, according to my fifth mode, in paving with blocks or pieces of wood of any convenient figure with the grain either vertical or inclined, *cemented together* by filling the interstices between the blocks with a mixture of sand, pulverized chalk, brick dust or other earthy matter, *united with pitch or other bituminous substances or suitable cement, which mixture will melt or soften by the application of heat, but remain firm at the highest summer temperature.* And in order to take up such block or batches of block for laying gas or water pipes, I provide a lever of iron, having a wooden han-

dle; *the iron end being made hot is thrust down into the interstice to melt the cement, and lift it out.*"

* * * * * * * *

"And, according to my sixth mode, in paving with blocks of wood of any figure upon a foundation of sand, ashes or saw dust, *saturated with tar or bituminous substance.*"

* * * * * * * *

"Figure 30 shews a batch of blocks of various sizes and figures *cemented together within a square space, which batch may be removed in a mass when the cement is melted away from the surrounding straight grooves.*"

The foundation is cemented, and the blocks are always locked in position either by pins, by cement, or by both.

David Stead, No. 8,041, 1839.

This patent describes and shows wooden blocks of a great variety of forms, so placed that the fibre shall be always vertical, without regard to the inclination of the road-bed. It is stated that the blocks may be cut transversely out of fir or other suitable timber.

Figures 16 and 17 show the pavement which is relied upon as an anticipation of complainants' patent.

It shows circular blocks laid in regular rows, the interstices, being left open, or partly or wholly filled up. The interstices when filled at all, are in every case filled with wood, either wedges or piles, or with asphalt or any other cement. "The smaller interstices or cavities between such circular blocks *may be either filled with wooden pieces suited to their shape or filled up with cement or asphalt, as may be found convenient.*"

The invention is stated to consist "in the paving and formation of public and private ways and passages, by means of wooden blocks, *so shaped and placed as to support each other in a close and compact manner*," etc.

How this can be done with circular blocks is a mystery,

except upon the theory that Stead, like all other pavement patentees of his time, intended to hold the blocks together by means of cement.

His round block pavement, with cavities entirely unfilled, would be of no practical value, especially upon an inclined roadway.

Osborne Reynolds, No. 8,940, 1841.

This patent describes two foundations: *a*, planks or beams of wood; *b*, transverse and longitudinal rods or beams of iron or wood.

Upon any one of these peculiar foundations is placed the roadway or pavement proper, which may be plank, rectangular blocks of wood placed close together, and sometimes locked by dowel pins, or blocks cut from the trunks of trees, shown in figure 13 as circular blocks, cemented together by wood fibre and concrete or asphalt placed in the interstices.

"The interstices between these blocks are to be filled up with the compound mass of fibres of wood and concrete or asphalt hereinbefore described."

Fontainemoreau, No. 10,187, 1844.

This patent shows a number of modes of paving with wooden blocks, the distinguishing characteristic in each case being the provision for locking the blocks together. In the majority of cases the blocks are so cut that the completed pavement forms an arch, in which the blocks are locked by compression, "movable keys," performing somewhat the same function as the keystone of an arch, being used.

But in almost every instance this is supplemented by other locking devices, also called "movable keys," consisting of wooden rods, lying in grooves cut in the meeting sides of the blocks.

He states his invention as follows: "The new or improved

mode or method of paving and covering roads and other ways or surfaces consists in the manner in which I set, asssemble and *join together wooden blocks by means of rods, key rods, pins, or bolts, which I adapt to every block and row of paving, so as to consolidate, connect and bring together every row*, that they may mutually sustain one another and form thus a whole of adequate solidity, but very easily raised and removed in case of repairs or any other underground operation, and in combining wooden blocks with granite or wooden blocks with bricks, Indian rubber, *asphalt, cement, marine glue and other similar substances to prevent horses slipping, and to increase the durability of the wood by diminisl ing its exposure to the influence of air and water.*"

Instead of having all of the blocks made of wood, part of them may be stone, brick, bitumen, etc., or some or all of the wooden blocks may be faced with these substances. Figure 17 shows a pavement of round blocks, and is described as follows: "They are jointed as the blocks hereinbefore described, *either with rods or pegs, which connect them horizontally.*

* * * * * * *

"The horizontal section shows the round logs, and that between the blocks triangular hollows or spaces are left, into which I *pour a material hereinafter mentioned, and which, on account of its elasticity and softness does not pulverize.*"

He does not distinctly state what this material is, but it is undoubtedly some bituminous matter, which will make a water and air tight covering, such as "*asphalt, cement, marine glue, etc.*"

UNITED STATES PATENTS.

H. M. Stow, No. 74,862, 25 Feb., 1868.

Rectangular wooden blocks with wedge-shaped lower ends are driven in rows into a foundation of sand or loose earth, to pack the foundation, and the spaces between the rows filled with gravel, and covered with boiling tar.

Charles Guidet, No. 85,814, 12 Jan., 1860.

An ordinary cut stone pavement.

This closes the list of patents. None of these patents show the Phillips combination. This is admitted in the opinion of the court below (p. 192, Record).

"While it is true that none of the patents offered in evidence exhibit the exact combination of complainants', there are several which approximate very closely to it."

Thus, of the three elements of complainants' combination Lindsay and McCarthy lack the first and third, Fontainemoreau lacks the third, Stow the first, and all the others lack the second and third.

As a claim for a combination cannot be infringed by the use of a portion of the elements thereof, so it cannot be anticipated by a printed description of only a portion.

If a combination claim can be defeated by finding one element in one patent, another in another patent, and so on, no such claim can ever be valid. And this cannot be done.

Bates vs. Coe, 98 U. S., 48.

On examining these patents closely, the curious fact appears that, notwithstanding the great attention paid to wood paving by inventors, none of them discovered that round wooden blocks, which of course cannot be wedged firmly together, could be held in place, or locked, by a simple filling of sand or gravel.

Thus we find in all these patents that, wherever round blocks are used, they are either firmly cemented together, or are locked by some such device as dowel pins.

Stead speaks of leaving the spaces unfilled when the pavement is on a grade, but such a pavement is clearly impracticable.

It would not stand the strain of travel for a week, unless the blocks were locked with dowel pins.

Stone blocks, from their great specific gravity, will retain their position better than wood, yet we find that when the blocks are cut they are wedged together, and when cobble stones are used, they are imbedded in the foundation.

PRIOR USE.

CHICAGO PAVEMENT.

James K. Thompson.

Cubical and rectangular blocks, laid in regular rows upon a sand foundation, interstices filled with sand.

Record, pp. 111-2.

The testimony of this witness about his patent for a wooden pavement (p. 121) shows his memory to be very unreliable.

Thomas Mackin, same as Thompson, pp. 126-7.

Henry L. Bristol, same as Thompson, p 138.

This pavement is not the Phillips combination. The testimony was taken in a suit in Chicago, many years after the pavement testified to had passed out of existence, and the accuracy of the testimony is exceedingly doubtful.

DETROIT PAVEMENTS.

Alanson Sheley, John Owen, Jacob S. Farrand, Ichabod Goodrich, Alexander Chapoton.

These gentlemen testify to a pavement composed of octagonal pine blocks, laid close together. There was no sand filling, and the witnesses cannot state what the foundation was.

Mr. Owen testified that the blocks were very unlike the blocks used since. (Page 151.)

Hubbard Smith. (Page 141.)

This witness testifies that, in 1852, he took up some round wood pavement at the foot of Brush street.

The pavement was so covered with mud that witness did not see it until he ran his plow into it.

The witness came here in 1851; had never seen any wood pavement until this piece. He saw this piece in 1852. His testimony was given in 1878, twenty-six years after. It did not occur to him that this pavement was a good one, yet, as soon as he saw the round block pavement, he knew it was a good one, and the first Phillips pavement was laid in Detroit in 1871.

Record, p. 147.

There is some mistake here.

Mr. Sheley, who has lived in Detroit many years, and Enos Lebot, who lived near this piece of pavement, both testify that this piece of pavement on Atwater and Brush streets was the octagonal pavement.

Record, p. 86.

Even if Smith is correct, this pavement, buried out of sight, and never uncovered except to be broken up, is an abandoned experiment, like the safe in *Gayler vs. Wilder*, 10 How., 496–8, and does not anticipate the Phillips patent.

James French.

This witness merely detailed the well-known method of laying cobble-stones.

But the permanent character of stone, its great specific gravity, non-liability to decay and wear, the entire dissimilarity in form of the bowlders to the blocks of Phillips', and the fact that each stone is separately imbedded in the foundation and the pavement is rough and uncomfortable, show clearly that the bowlders are not the equivalents of the rough, round blocks.

David Wilkie.

This witness testified that the Phillips pavement was laid as a stable floor in London, Canada, between 1861 and 1864.

No patent or description of that pavement in a printed publication is shown, and this user in a foreign country does not anticipate Phillips' patent.

Roemer vs. Simon, 95 U. S., 218.

This branch of the case is of little consequence, and is conclusively answered in the opinion of the court below.

Record, p. 194.

The defendant having thus failed to directly impeach the novelty of Phillips' invention, the only remaining defence to the patent is the one adopted by the court below, viz.: "that the variations made from previous patents does not involve the exercise of the inventive faculty; in other words, that, considering the state of the art in 1869, a sample combination of round blocks with a sand filling and foundation, was not patentable within the meaning of the law."

Record, p. 194.

The state of the art referred to by the court includes both stone and wooden pavements.

The reasoning against this patent, so far as it is based upon cobble and other old stone pavements, is that Phillips' invention is a mere substitution of material, wood for stone, and therefore not patentable.

The cases on this subject are as follows:

In *Hotchkiss vs Greenwood*, *11 How.*, *266*, the patent was for a porcelain door knob.

It appeared that the only difference between the patented article and what was in common use previously, was the material of which the knob was made, the old knob being metal, glass or wood, the new one porcelain. The new knob performed only the functions of the old one, and nothing more.

And the court said, "The improvement consists in the superiority of the material, and which is not new, over that previously employed in making the knob. But this, of itself, can never be the subject of a patent. No one will pretend that a machine, made, in whole or in part, of materials better adapted to the purpose for which it is used than the materials of which the old one is constructed, and for that reason better and cheaper, can be distinguished from the old one; or, in the sense of the patent law, can entitle the manufacturer to a patent."

"The difference is formal and destitute of ingenuity or invention. It may afford evidence of judgment and skill in the selection and adaptation of the materials in the manufacture of the instrument for the purpose intended, but nothing more."

Hicks vs. Kelsey, *18 Wall.*, *670*, was a case where iron was substituted for wood, or wood and iron, in making a wagon reach, "the purpose being the same, the means of accomplishing it being the same, and the form of the reach and mode of operation being the same."

"The use of one material instead of another in constructing a known machine is, in most cases, so obviously a matter of mere mechanical judgment, and not of invention, that it cannot be called an invention, *unless some new and useful result, an increase of efficiency, or a decided saving in the operation, is clearly attained.*"

The decision in *Elizabeth vs. Pavement Co.* shows that this rule cannot be general as applied to wood pavements.

But it is urged that the Phillips pavement is exactly the old cobble stone pavement, wood blocks being substituted for stone, and therefore not patentable, the foundation and filling being the same in both cases.

In constructing a stone pavement, whether cobble or any other, the paver is dealing with materials which are substantially imperishable. All that he has to do is to make his

pavement solid, and as smooth as the form of stone used will permit.

The specific gravity of stone keeps the blocks in place under ordinary circumstances, and the stones can be safely wedged close together.

With wooden blocks as the material to be used, new and difficult questions are instantly presented.

The blocks are light, and must be in some way locked in position. The English patents produced by defendant show how important this feature was deemed by inventors, and to what expensive and ingenious devices they resorted to hold the blocks in place.

But the great difficulty with wooden pavements is the rapid destruction of the blocks by decay. No proof of this is necessary, for it is within the common knowledge of the people, and the would-be inventor of a wooden pavement finds himself confronted with this serious problem : In what manner can I lay my pavement so as to make it solid, and yet prevent decay of the blocks?

Where a change of material introduces new considerations like these, there must be room for invention.

At the date of Phillips' invention, the result which is attained by this use of wooden blocks in their natural form upon a sand foundation and with a sand filling, avoiding entirely close contact of the blocks, splitting the blocks, and the use of cement, was not obvious to skilled pavers, and this will appear plainly when the Phillips pavement is compared with preceding wood pavements.

The reasoning against the patent, as based on preceding wooden pavements, is t..at all the elements of the Phillips pavement being old, nothing was required but the skill of a paver in selection and adaptation, without any exercise of the inventive faculty.

It is exceedingly difficult to formulate a rule which will in

all cases point out the exact line where the skill of a mechanic in adaptation begins, and the work of an inventor ceases.

"At this point we are constrained to say that we cannot yield our assent to the argument that the combination of the different parts or elements for attaining the object in view was so obvious as to merit no title to invention. Now that it has succeeded, it may seem very plain to any one that he could have done it as well. It may be laid down as a general rule, though perhaps not an invariable one, that if a new combination and arrangement of known elements produce a new and beneficial result, never attained before, it is evidence of invention. It was certainly a new and useful result to make a loom produce fifty yards a day when it never before had produced more than forty; and we think that the combination of elements by which this was effected, even if those elements were separately known before, was invention sufficient to form the basis of a patent."

Loom Co. vs. Higgins, 105 U S., 591.

"Webster, on the subject matter of patents, page 30, says: 'The utility of the change, as ascertained by its consequences, is the real practical test of the sufficiency of an invention; and since the one cannot exist without the other, the existence of the one may be presumed on proof of the existence of the other. Where the utility is proved to exist in any degree, a sufficiency of invention to support the patent must be presumed.' We do not say the single fact that a device has gone into general use, and has displaced other devices which had previously been employed for analagous uses, establishes in all cases that the later device involves a patentable invention. *It may, however, always be considered, and when the other facts in the case leave the question in doubt, it is sufficient to turn the scale.*"

Smith vs. Vulcanite Co., 93 U. S., 495.

And in commenting on the case of *Hotchkiss vs. Greenwood*, the court says: "The improvement, therefore, was nothing more than the substitution of one material for another in constructing an article. The clay or porcelain door-knob had no properties or functions which the other door-knobs made of different materials had not. It was cheaper, and perhaps more durable; but it could be applied to no new use, *and it remedied no defects which existed in other knobs.* Hence it was ruled that the alleged improvement was not a patentable invention." * * * * * *

"But where there is some such new and useful result, where a machine has acquired new functions and useful properties, it may be patentable as an invention though the only change made in the machine has been supplanting one of its materials by another."

In determining whether a given change in construction has or has not produced a new and useful result, the character of the patented article must be considered.

In case of a machine, where the mechanism operates upon other substances, the result can easily be estimated, as in the loom case cited.

But where the patent covers an article of manufacture the proper test seems to be that recognized in the foregoing citations, whether it has remedied any defects which existed in analogous articles. And if we find serious defects existing in all those articles, and those defects are remedied by the patented improvement, is it not strong evidence of invention?

The first element of the Phillips pavement, round blocks, is found in the English patents of Parkin, 1839, Stead, 1839, Reynolds, 1841, and Fontainemoreau, 1844. None of these patents, however, recognize the fact that these round blocks can be locked in position by a simple sand filling.

They all provide ingenious means for locking the round blocks in position, and all use asphalt or other cement for this purpose.

It clearly appears from the evidence in this case that the change from a cement lock, or filling, to a sand lock, produces important and unexpected results.

And the fact of the new results does not rest in speculation, nor the theories of experts.

A piece of Phillips pavement was laid on Hastings street, Detroit, in 1872. In October, 1878, its condition was as follows:

A. I was on it yesterday afternoon, I was on it this morning, and it has every appearance of being in very good condition.

Patrick, Record, p. 72.

Q. In what condition is that pavement?

A. In a fine condition, considering the time it has been laid and the travel, which is very heavy at that point.

Gordon, Record, p. 74.

Q. What condition was that in?

A. It looked to be in good condition.

Q. Was it worn in holes, or smooth?

A. It was smooth—in very fair condition for the time it has been paved.

Crabbe, Record, p. 76.

Q. In what condition is that pavement?

A. Just as good, except for natural wear, as it was when it was put down.

Coon, Record, p. 81.

Q. What was the condition of that pavement?

A. It was in very fair condition.

McMillan, Record, p. 83.

Q. In what condition did you find the pavement on Hastings street and Clifford street?

A. I found from the appearance of the surface that it was in very good condition. I took up two or three square yards,

and I did not find a rotten block on either of the streets. They were worn on top a little, but there was no decay on either of those streets.

Patrick, Record, p. 78.

The Phillips pavements on Hastings and Clifford streets were cedar blocks in their natural state, laid on a sand foundation, with a sand filling.

Record, pp. 72, 74.

In 1871 a piece of pavement was laid on Grand River avenue, Detroit, built as follows:

"There is a foundation of concrete ballast and on it was laid five-inch round cedar blocks, filled in with gravel, and on that was put a solution of pitch and tar, and one inch of sand was put on top."

Patrick, Record, p. 96.

The witnesses Patrick, Robinson and Farwell, all testify as to the excellence of the material used in this pavement.

Record, p. 97.

This was a genuine Parkin, Stead, Reynolds or Fontainemoreau pavement, round block, cement foundation and filling, and might have been built from any one of those patents. In March, 1879, the condition of that pavement was as follows:

Q. State in what condition you found the cedar blocks in that pavement.

A. I found them in a very dilapidated condition.

Q. Describe their condition as near as you can.

A. The street is all irregular, being full of holes caused by the blocks being rotten where the depressions are.

Patrick, Record, p. 96-7.

Charles M. Dailey, superintendent of the Grand River Street Railway, said that in the fall of 1878 he took up and repaired some of that pavement, and described its condition thus:

Q. How were the original blocks which you took up and replaced?

A. They were rotted, partially.

Q. Mr. Dailey, what is the general condition of that pavement?

A. Well, it is bad; worse than I wish it was, for my sake. There is a great deal of it will have to be replaced this summer.

Q. Is it from being worn out or from decay?

A. *It is decay.* There are places of round blocks which are in good condition; there are places on the track where it is sound and good, *but most of it is decayed.* I have not had occasion to examine it this summer, but where I have taken it up I have found a good many rotten places.

Record, p. 98.

All of this evidence relates to public streets, so that if it was not strictly true, the defendant could have easily disproved it, and would certainly have done so.

We have here therefore two pavements, constructed of blocks of the same shape and material, the Phillips perfectly good and with no signs of decay, and the Parkin-Stead-Reynolds-Fontainemoreau decayed and dilapidated, although only one year older.

This enormous difference in result shows a radical difference between the two pavements

But defendant's counsel claim that the difference in construction which produces this great difference in result, is one which is obvious to any skilled paver, and requires no invention.

If so obvious, why is it that not one of these elaborate English patents recognizes the possibility of the Phillips construction? Can it be doubted that these patents would have shown and described round blocks on a sand foundation, and with a sand filling, if such a pavement had even been deemed practicable, without any idea of the different result that would thereby be attained?

The second and third elements of the Phillips combination, the sand foundation and filling, are found in other old patents in the record, but they are invariably found in combination with split blocks, usually wedged close together.

Detroit also had pavement of this kind, and the result was the following:

Q. Are you acquainted with the pavement on Elmwood avenue in the city of Detroit, if so, what kind of pavement is it and when was it laid?

A. I ought to know pretty well about that street; it cost me enough money in the first place to lay it. I live on that street. *That street commenced to go to pieces the second year after it was laid*, which was in 1872, I think.

Q. What kind of pavement?

A. The Ballard pavement laid upon sand.

Q. Please describe the Ballard pavement.

A. It has a rectangular block square, of pine, grooved on the side so as to lock into each other, and consequently brings the wood tight up against each other, making a solid wooden pavement laid on sand.

Q. What is the present condition of that pavement?

A. Where it has not been displaced with cedar it is in very dilapidated condition.

It is true that these blocks were pine, and in the Phillips pavement they were cedar, but it would be absurd to say that, other things being equal, pine would decay in two years while cedar after six years would show no indications of decay.

The true cause of the decay is that the blocks were placed in close contact, and it seems to be certain that if blocks are split, and especially if they are placed close together, they will decay rapidly.

This is clearly set forth in the evidence of Mr. Patrick, on pp. 79–81. And the evidence of Mr. John H. Lawrence, a man of long practical experience, is very clear on this subject. He says that from 1864 to May, 1872, he had charge of paving and general supervision of streets in Cincinnati. That

the Phillips pavement, when properly laid, is the best wooden pavement he has ever seen, and that it has been put where neither the Nicolson nor the boulder pavement would stand, that "it is much cheaper, simpler in construction, and more durable than other wood pavement with which I am familiar," and that the reason of its superior durability is not only the wood of which it is composed, but also the manner and method of its laying.

How have other wooden pavements stood the test of comparison with the Phillips?

This can be best answered by the following table of pavements laid in Detroit, a city which paves almost exclusively with wood:

Year.	Phillips.	All others
1871	None.	284,672 yds.
1872	6,876 yds.	16,376 "
1873	None.	56,871 "
1874	53,864 "	17,588 "
1875	138,835 "	None.
1876	105,000 "	"
1877	119,277 "	"

Record, pp. 87-8.

Is this not "sufficient to turn the scale" on this question?

We concede that mere cheapness is not alone absolute proof of invention. But in matters which pertain to public works, where great expense is necessarily involved, we think that a discovery which gives as good an article as was had before, at a much less cost, has strong claims to be called an invention.

It appears from the evidence of Mr. Farwell (Record, p. 89) that the Phillips pavement is from 25 to 40 cents per yard cheaper than any other standard wooden pavement laid in

Detroit, a saving to the city, at an average difference of 32 cents per yard, of $133,374.72 in 1874–5–6 and 7.

Is not this a very important result?

Upon the foregoing facts we submit that the Phillips pavement derives its peculiar value from:

1. The cylindrical shape of the blocks, which reduces the contact of the blocks with each other to a *minimum*.

2. The porous sand foundation.

3. The porous sand filling, which locks the blocks firmly in place, while admitting free passage of water.

And we submit that this combination makes a pavement which not only outlasts any other known form of wooden pavement, but is from 25 per cent to 40 per cent cheaper, and that if "it was certainly a new and useful result to make a loom" (by a new combination of old elements) "produce fifty yards a day when it never before had produced more than forty," it is much more of a new and useful result to so combine old elements in a simple, cheap manner, as to make a pavement so simple that it is surprising that it was not earlier discovered, outlast any other known pavement of the same material?

Is not "*an increase of efficiency, or a decided saving in the operation clearly attained?*"

We must presume that the patentees whose patents have been presented by the defendant recognized the value of durability.

It would be absurd to suppose that they directed their efforts to producing a short-lived pavement.

But whenever they used round blocks they supposed that a cement filling was necessary to hold the blocks in place.

Some of them even supposed that a cement filling was necessary to preserve the blocks, for we find in the rejected application of H. F. Williams, filed 10th June, 1868 (Record,

p. 174), this passage: "Experience has shown that a wooden pavement composed of blocks set on end will not be durable unless spaces are left between the blocks and filled with gravel, sand, or some similar material, *saturated with some pitchy substance.*"

And at the end of this long line of patents and experiments, Mr. Phillips devises a new combination of these old elements, very cheap and simple, thoroughly practical and easy to lay, and we find that this new combination, when once brought to the knowledge of the public, sweeps all competing devices out of the field, saves a large amount of money to the tax payers, in the first instance, and saves a much larger sum in the end by reason of its great superiority.

We think it is not at all extravagant to say that this Phillips pavement is more of an improvement on all prior wooden pavements than was the loom in Loom Co. vs. Higgins, or the Cummings dental plate, over the devices which preceded them, and submit that it shows invention, and that of a high order.

GEO. H. LOTHROP,
Counsel for Appellants.

11-604

OFFICE SUPREME COURT U. S.
FILED
APR 17 1884
JAMES H. McKENNEY, Clerk.

SUPREME COURT OF THE UNITED STATES.

APPEAL FROM CIRCUIT COURT OF THE UNITED STATES,
EASTERN DISTRICT OF MICHIGAN.

OCTOBER TERM, 1883.

No. 345.

J. HOWARD PHILLIPS, ET AL., EXECUTORS, ETC., OF
ROBERT C. PHILLIPS, DECEASED, ET AL.,

vs.

THE CITY OF DETROIT.

BRIEF OF D. C. HOLBROOK,

OF DETROIT, MICH., FOR DEFENDANTS.

THE SUPREME COURT OF THE UNITED STATES.

J. HOWARD PHILLIPS, GARRETSON TOMPKINS, Executors of ROBERT C. PHILLIPS, EUGENE ROBINSON and JESSE H. FARWELL, Appellants,
vs.
THE CITY OF DETROIT.

Appeal from the Circuit Court of the United States for the Eastern District of Michigan.

BRIEF OF D. C. HOLBROOK, FOR DEFENDANT.

The bill in this cause was filed to enjoin the defendant from laying a wood pavement, alleged to be patented to Robert C. Phillips, deceased, and for a decree for damages for laying such pavement.

The bill is of the usual kind. The defendant admits the user, but insists:

1. That Phillips was not the inventor of what he terms his improvement.

2. That the same pavement had been constructed and used for years before his application for a patent, and with his knowledge.

3. That the same was fully published and described in letters patent set forth, with the dates, etc.

4. That Phillips' application does not sufficiently state what his invention consisted of, that is, what was old and what was new. He does not claim any part as new, nor any new combination as such of what was known before.

FIRST.

There is not one word in this specification (Record, pp. 69–70) claiming anything or any part as new, nor is the combination distinctly claimed as a new combination.

The specification concludes with a claim for a pavement described at length, but immediately preceding it is a disclaimor of every separate part of which the pavement consists; therefore, as no part is claimed as a separate invention or improvement, the patent must have issued for a combination only, and can only be valid for a combination of all described.

SECOND—AS A COMBINATION IT WAS NOT NEW.

Many patents and specifications all set up in the answer and stipulated (Record, pp. 170–1–2) to be read in evidence, were introduced by the defendant.

Copies of these specifications in full, or such parts as are deemed material to this case, are printed at the conclusion of this brief, for the convenience of reference.

It will not be denied that the foundation, and blocks of wood cut from trees in their natural state were in use, and de-

scribed in these specifications more than twenty years prior to the Phillips patent.

Each of the specifications of the following patents contain suggestions or describe exactly the Phillips patent:

David Stead	1839,	Exhibit	A.
David Stead	1838,	"	B.
Osborn Reynolds	1841,	"	D.
Le Count de Fontaine Moreau	1844,	"	E.
Charles Guidet	1869,	"	F.
Henry M. Stowe	1868,	"	G.
Gardner Warren	1869,	"	H.
John Lindsay	1825,	"	I.
Thomas Parkin	1839,	"	J.
Thomas Wood	1840,	"	K.
Talmadge E. Brown	1865,	"	M.
John J. McCarthy	1825,	"	N.
Williams' Exhibit, application	1868,	(174 of Record.)	

The foundation and blocks in their natural shape having been used in combination years ago, the question is whether the filling of sand *only* renders the combination patentable, when the spaces between the blocks have been filled with sand, gravel, pitch, etc., and used in combination with sand foundation and blocks, to wit:

Lindsay, 1825, Gravel or grout.

McCarthy, 1825, Cement, sand or other materials.

Stead, 1838, Pitch, sand and earth.

Stead, 1839, Asphalt or any other suitable material.

Parker, 1839, Sand, chalk, brick dust or other matter, united with pitch and so forth.

Wood, 1840, Concrete or coal tar, asphalt and so forth, heated and mixed with gravel, sand or such like materials.

Reynolds, 1841, Compound mass of fibres of wood, and concrete or asphalt.

Austin, 1848, Broken stone, slate, grit, gravel, sand with pitch, etc., poured in.

Armand, 1844, Cover with a bed or layer of sand.

Brown, 1870, Earth and gravel, concrete or other suitable filling.

Stowe, 1870, Sand, gravel, broken stone, concrete.

Guidet, 1869, Sand.

Williams, 1868, Gravel and sand

It is contended that in none of these specifications is there filling with sand alone, without other substances combined with it.

The Stead patent, 1839, Exhibit A, calls for a foundation suitably prepared, blocks of fir or other suitable timber, cut transversely firmly connected together by means of asphalt, or another suitable material. A "suitably prepared" foundation means any foundation proper for the purpose; "suitable timber" means anything fit for the purpose; firmly cemented together by means of asphalt, or any other "suitable material," means any material for filling.

McNamara vs. Hulse, Payne & Marshman's R., 471.

If this application of the word *suitable* is correct, then Stead's patent includes and covers everything in the Phillips' claim.

The Stead patent, Exhibit B, 1838, is for a pavement of vertical blocks of wood, without describing the shape, etc., with a roadway prepared solid as possible, and to the figure of intended slopes, having sand or other fine filling, driving each block up to those against which it is to rest.

There is no cement, asphalt, tar, pitch or bitumen, etc., required in this pavement, although they are suggested as advantageous.

The Parkins patent, 1839, Exhibit J, has blocks of natural wood, sand foundation, filling of sand, etc., united with pitch; with the exception of using pitch, is the same as the Phillips patent.

The defendant claims that if any patented pavement described as composed of a sand foundation, round blocks, and a filling of sand, *or any equivalent*, existed prior to the Phillips patent, it was void.

There is no evidence in the case as to the superiority of fillings; we find fillings of wood, compound mass of fibres of wood, cement, concrete, gravel, sand, melted pitch, pitch and sand, asphalt, mixture of sand, pulverized chalk, brick dust, earthy matter united with pitch, or other bituminous substances, broken stone, refuse of broken slate, grit, caoutchouc, liquid lime, rattan and bamboo used as filling.

At this stage of the art, was there "mind ingenuity" or invention by Phillips, in merely putting together old and well known things, which had been used for the same purpose and producing the same result?

Buck vs. Hermance, 1st Blacht., R., 399.

Having disclaimed sand filling separately, and not claiming it in the specification as an invention in connection with the combination, the patent is not valid, if any pavement with like foundation and blocks, with filling of *any substance*, had before been constructed.

Clarke vs. Adie, 19 Moaks Eng. R., 132 (2d appeal cases, Eng. 315.)

SPECIFICATIONS.

No. 8041, A. D. 1839. EXHIBIT "A."

(Additional Record, p. 1.)

David Stead, for an improved mode or method of [illegible] paving private streets and highways, and public [illegible] roads, parks, courts and bridges with timber or wood [illegible]

"The invention consists in the paving and [illegible] the roadway of public and private ways and passages [illegible] of wooden blocks, so shaped and placed as to [illegible] other in a close and compact manner, the foundation [illegible] suitably prepared, to the required figure by the usua[illegible]

means, to receive such wooden blocks, which are so disposed as to present an even and uniform surface, and always having their fibers in a vertical position whether the roadway has a curved, inclined, or horizontal face. The blocks, which I use for the improved paving, *are cut transversely out of fir or other suitable timber*, or they may be composed of deal plank ends or small pieces of timber, firmly cemented together, to any of the required figures hereinafter described by means of asphalte or any other suitable material.

"And when it is required to form a roadway upon a steep acclivity I propose to place the blocks or to have them of such form or forms as are hereinafter described, so that channels and cavities shall be left to afford a surer footing or hold for the feet of the animals traversing over such inclination.

"Figures 16 and 17 is a plan and end view of another kind of the improved paving, which is formed by a series of circular blocks, i, i, i, placed as represented in the drawing and made parellel to the curb stone of the foot way, by the semi-circular and quadrant pieces j and k; the smaller interstices or cavities between such circular blocks may be either filled with wooden pieces suited to their shape, or fitted up with cement or asphalte, as may be found convenient, and when this kind of paving is laid upon an inclined surface, I should recommend the cavities to be not filled up (provided the circular blocks are not too large, so as to render such cavities inconveniently large), as additional hold may thereby be afforded to the feet of draught animals ascending such inclined way, as already alluded to.

"Figures 18 and 19 is a plan and side view of a portion of a roadway, formed by a series of octangular blocks, L, L, placed with the fiber vertical, so as to leave a square recess or interval between them, into which may be inserted a corresponding piece m. When this kind of paving is laid upon a road formed upon a newly made embankment or shrinking base, I should recommend a pile to be driven into the earth, through the square recess or interval, of about the size and form represented by the dotted lines, figure 19, in order to support and keep the blocks firm in their position. When the octangular block paving is used for acclivities, I should recommend the before-mentioned cavities either to be left unfilled or not filled up to the surface, to afford an assistance to animals ascending the same, as before described.

"Figure 20 is another manner of placing an improved road- constructed of hexagonal blocks, being placed angle ...stead of side to side, so as to leave triangular spaces ...em, if used for inclined or other roadways, which may be filled up or left partly unfilled for the purposes hereinbefore alluded to, or a series of deal ends composed of portions of a plank, cut transversely, may be introduced between the hexagons as represented, v, v, so as to leave a portion projecting above the surface to afford the hold for the feet of horses or other animals, as before stated"

No. 7645, A. D. 1838. EXHIBIT "B."

(Additional Record, p. 6.)

David Stead, for making or paving public streets and highways, and public and private roads, courts and bridges, with timber or wooden blocks.

"The blocks of wood are to be placed on the earth or formed with *the grain of the wood in a vertical position;* and in applying such blocks as a paving, the surface of the road or other such way *is to be prepared in as solid a condition as possible*, and to the figure or intended slopes, and the blocks are successively to be applied, having *sand or other fine filling*, driving each block up to those against which it is to rest.

"It will be found advantageous to fill up the interstices, between the blocks of wood, with melted pitch, or pitch and sand or earth combined, though this is not essential, and I make no claim for such using of pitch and sand or earth."

No. 9737, A. D. 1843. EXHIBIT "C."

(Additional Record, p. 8.)

Henry Austin, for improvements in wood pavements, floorings and veneers.

"The nature of my invention consists in gluing or cementing, in the manner after described, blocks of wood cut and placed, as after described, on to planks or slabs or other pieces of wood, or on to stone, slate or iron, for wood pavements.

"The wood, stone, slate or iron, on which I glue or cement the blocks for pavements, I denominate the bed or foundation of the blocks.

"I glue or cement the wooden blocks, of any convenient shape and size, without any fastening or connection together of the blocks, and with intervals or spaces between them to the entire depth of the blocks; these intervals or spaces may be of the width of an inch and a half, or thereabouts, and are to be filled in with broken stone, refuse or broken slate, grit, gravel, sand, or any hard or any fibrous substances, this filling in being cemented or concreted together with liquid lime or cement poured in, or with pitch or lac and caoutchouc dissolved in naphtha, melted and poured in, or with any other adhesive liquid materials. The pavement thus formed will present a constant secure footing and avoid that slipperiness which is prevalent in other wood pavements, when worn; and the great advantage which will be found in this mode of pavement is, that the footing in its wear will keep pace with the wear of the blocks, and still present the same secure foothold.

"When the foundation is stone, slate or iron, the blocks are to be glued or cemented on to such foundation, in like manner, as on to wood foundations."

No. 8940, A. D. 1841. EXHIBIT "D."

(Additional Record, p. 12.)

Osborne Reynolds, for improvements in paving streets, roads and ways.

"Another improvement consists in constructing the roadway *with pieces of the trunks of trees, cut into suitable lengths, as from three to ten inches,* and placed with their *fibers vertical* side by side *in their natural state, without being cut or hewn into any particular shapes.* The interstices *between these blocks are to be filled up with the compound mass of fibers of wood and concrete or asphalte,* hereinbefore described."

No. 10187, A. D. 1844. EXHIBIT 'E."

(Additional Record, p. 16.)

Peter Armand (Le Comte de Fountainemoreau), for a new and improved mode or method of paving and covering roads and other ways and surfaces.

"The new or improved mode or method of paving and covering roads and other ways and surfaces, consists in the manner in which I set, assemble and join together wooden blocks * * * and in combining wooden blocks with granite, or wooden blocks with bricks, India rubber, asphalte, cement, marine glue, and other similar substances to prevent horses slipping, and to increase the durability of the wood by diminishing its exposure to the influence of air and water; the ground for laying my new and improved mode of paving does not require any setting, it is only to be rendered smooth and even, and then to be covered with a bed or layer of sand, by laying the blocks upon a body of sufficient elasticity to yield to the jolts and weight of the passing carriages.

"This form of paving allows the employment of round blocks, *any log of wood may be used for this kind of pacing.*

"Instead of hexagonal I can employ with equal advantage circular blocks, as shown in the plan and two sections which compose figure 17, drawing II.

"Any kind of wood, whatever may be its size, can be used for this form of paving, because this form approaches very nearly to the shape of the trees, and it is more easily prepared, and does not require any particular labor.

"I make another arrangement, by cutting away from the faces of the block three-quarters or one inch of wood, which space will be afterwards filled with bitumen.

"What I claim as the invention is first, the mode or method of preparing the ground by a layer of sand for the wooden, and combined wood and granite, wood and brick, asphalte, bitumen, kinds of paving, as I have before described."

No. 85814, A. D. 1869. EXHIBIT "F."

(Record, p. 174.)

Charles Guidet, for improved stone pavement.

"Figure 1 represents a longitudinal section of this invention; figure 2 is a plan or top view thereof.

"Similar letters of reference indicate corresponding parts in the two figures.

"This invention relates to a pavement which is composed of stone blocks forming parallelopipeds, the narrow ends or edges of which are cut smooth, while their broad sides are cut purposely uneven or rugged, the top edges of said broad sides being chamfered off in such a manner that said blocks, when put together, form close joints at their narrow ends and open joints at their broad sides, and a pavement is obtained which offers a good foothold for the draft animals, at the same time a smooth surface for the wheels passing over the same.

"A, represents a section of my pavement which is composed of a series of stone blocks, B. These blocks are cut in the form of parallelopipeds, unlike the blocks used in what is known as the Russ or Belgian pavement, which are cut in the form of inverted truncated pyramids; and, furthermore, the narrow edges or ends *a*, of my blocks are cut smooth while the broad sides or surfaces, *b*, thereof, are purposely cut rugged or uneven, and the top edges of these broad sides, are chamfered off as shown at *c* figure 1. If two inverted truncated pyramids, as used in the Russ or Belgian pavement, are placed side by side a close joint is formed on the top surface, and the pavement thus produced offers no foothold to the draught animals; but by placing a series of my blocks B together, as shown in figure 2, the joints between the smooth, narrow edges, *a*, which run parallel with the sides of the street, become close, while the joints formed between the broad rugged surface, *b*, with the chamfered edges, *c*, which joints run transversely across the street, become open and a pavement is formed which offers a firm hold to the draught animals, while it presents a smooth surface to the wheels passing over it. The open joints left between the rugged surface *b*, of the blocks are filled with sand, and the pavement becomes perfectly firm and solid, and the single blocks are not liable to work loose."

No. 74862, A. D. 1868. EXHIBIT "G."

(Record p. 176.)

Henry M. Stowe, for improved street pavement.

"The nature of my invention consists in driving down into a foundation bed of sand or loose earth, tiers of wedge-shaped wooden blocks, with spaces between said tiers filled with gravel, as hereinafter more fully set forth.

"In the accompanying drawings, figure 1 is a section of my pavement completed, shown in perspective; fig. 2 is a

side elevation of a section of said pavement in process of construction.

"A A, figs. 1 and 2 are wooden blocks as they stand in the completed pavement, their lower ends being made in wedge form, by leveling one side only, and said wedge shaped ends driven down in the foundation bed of sand or earth. B is a gravel packing between the tiers of wooden blocks. A' A', fig. 2, are similar wooden blocks, as set in process of constructing the pavement, before being driven down into the foundation bed, and B' is a space between the tiers of blocks to be filled with gravel, or sand and gravel. C C are removable strips to be used in constructing the pavement, but forming no part thereof when finished. These strips are placed between the tiers of paving blocks in constructing the pavement, simply to keep said tiers a proper distance apart in straight rows, and the blocks in a true vertical position. They are made in two parts of wedge form, lapping together, as is clearly shown in the drawings, to facilitate their withdrawal from between the tiers of blocks when the latter are driven home.

"These strips may be made of wood or metal. The paving blocks may be about three inches thick, from six to ten inches long (or deep), and of any desired width, but I do not limit myself to any specific dimensions. The removable strips should be about one inch thick.

"To prepare the street for the putting down of this pavement, it should first be filled with a bed of sand or loose earth to within say five inches of the desired top of the pavement (but varying according to the length of the paving blocks to be used), and then graded to correspond with the desired arch or crown of the pavement. The sand or earth should be thoroughly saturated with water, then the paving blocks, with the intervening removable strips are placed as shown in the drawings, first a tier of wedge-shaped blocks across the street from curb to curb, and then a tier of strips (which may be of any convenient length), and so on alternately, a tier of blocks and a tier of strips, until a section of say ten feet or more of the pavement has been thus laid. The blocks are then driven down evenly with a heavy beetle or rammer, until a firm foundation is made by the packing of the sand or earth, effected by the wedge shape of the blocks. The section of pavement before driving down the blocks, should be secured by proper means against spreading, as the blocks are driven down. The paving blocks are to be so constructed and set in the pavement, that the grain of the wood will be vertical. When the said blocks are properly driven down, the removable strips are to be withdrawn and the spaces between the tiers of blocks are to be filled with clean gravel, the pebbles averaging as near as may be from one-fourth to one inch in diameter, the said gravel to be well packed by rammer and swage. Or, instead of filling said spaces with all gravel, they

may be filled to within about an inch and a half of the top of the blocks with sand well packed in with rammer and swage, and the residue of the space filled with gravel, as aforesaid. When the pavement is thus completed, the whole surface should be subjected to a boiling hot coating of coal tar and asphaltum, or oil and asphaltum, or any other kind of suitable pitchy substance, and then covered with a thin layer of coarse sand or very fine gravel. The blocks before being put down in the pavement, may be saturated with coal or gas tar, or any liquid or hydro-carbon, or other resinous substance which will tend to preserve the wood from decay.

"Having thus fully described my invention, with the method of carrying it into effect, what I claim as my invention and desire to secure by letters patent, is a pavement composed of tiers of wedge-shaped wooden blocks, driven into a foundation bed of sand or earth, with spaces between said tiers, packed with gravel, or sand and gravel, substantially as shown and described."

No. 96062, A. D. 1869. EXHIBIT "H."

(Record, p. 179.)

Application filed August 28, 1869.

Gardner Warren, for improvement in laying street pavements.

"My process consists as follows:

"The roading of the street is first brought to the proper grade, the soil used for the purpose being almost universally a mixture of sand and gravel, the latter being greatly in excess of the former.

"The roadway thus prepared is then to be 'puddled' with water, preferably, by elevating such water to considerable height, and allowing it to fall in an extended spray, or in any way by which the soil shall become thoroughly saturated, the result being a uniform, even, and very solid mass, which becomes the foundation of the pavement.

"An ordinary street sprinkler would, perhaps be the most available means of distributing water upon the road-bed.

"Upon the foundation thus prepared the pavement is to be directly laid in any well known manner.

"Should this pavement be composed of wood, its surface is to be covered with sand and water, applied as before explained, by which means the interstices between the blocks are instantly filled, thus avoiding the loss of time as well as an additional expenditure of animal labor, attendant upon the plan heretofore practiced in similar cases, of throwing dry sand upon the pavement and allowing time and the travel over it to effect the proper packing of the interstices.

"Although the practice of puddling sand and gravel, for various purposes, has long been in use, it has never, so far as my knowledge extends, been applied to the preparation of road beds as a foundation for pavements.

"What I claim as my invention, and desire to secure by letters patent of the United States, is the process hereinbefore explained, of laying street pavements, the same consisting, in brief, of first grading the road bed, next puddling the mass of soil, and after depositing the pavement thereupon, packing the interstices between the blocks of the latter by means of sand and water."

No. 5185, A. D. 1825. EXHIBIT "I."

(Additional Record, p. 27.)

John Lindsay, for certain improvements in the construction or formation of the horse and carriage ways of streets, turnpikes and other roads.

"Instead of laying them (the stone) with their broadest ends upwards, I lay them with their broadest ends downwards, and as each stone is made of a wedge form, this leaves a considerable space open between the stones; these I close with smaller stones of a wedge form, which being carefully placed and well rammed down after a sufficient quantity of fine gravel or grout has been worked between them, will make a pavement nearly as substantial as a solid sheet of granite.

"I would recommend the under surface to be covered with rough stones, laid with their broadest ends downwards, as shown at E, E, and between these, wedge formed pieces should be laid to fill in the interstices, over which a stratum of broken granite should be laid of the usual thickness."

No. 8026, A. D. 1839. EXHIBIT "J."

(Additional Record, p. 31.)

Thomas Parkin, for improvements in railroad and other carriages, in wheels for such carriages, and in road and ways on which they are to travel.

"According to my fifth mode, in paving with blocks or pieces of wood of any convenient figure, with the grain either vertical or inclined, cemented together by filling the interstices between the blocks with a mixture of sand, pulverized chalk, brick dust, or other earthy matter united with pitch or other bituminous substances, or suitable cement, which mixture will melt or soften by the application of heat, and according to my sixth mode, in paving with blocks of wood of any figure, upon a foundation of sand, ashes, or saw dust, saturated with tar or bituminous substance, especially if boiled, laid upon the natural ground for the blocks to rest on.

"In the case of small blocks being used, the grooves or furrows are formed by chamfering off the outer edges of the upper surfaces of the blocks, which furrows and champferings may be made deep, and filled up with asphalte or other cement, or gravel and sand, the object being in both cases to prevent the horses' feet slipping.

"Figure 30 shows a batch of blocks, of various sizes and figures, cemented together within a square space, which batch may be removed in a mass when the cement is melted away from the surrounding straight grooves.

"And according to my sixth mode of paving, I claim the right of laying upon the natural ground or foundation of the road, a layer of sand, ashes or saw dust, saturated with tar or other bituminous substance, especially if boiled, for the blocks to rest upon."

No. 8657, A. D. 1840. EXHIBIT "K."

(Additional Record, p. 51.)

Thomas Wood, the younger, for improvements in paving streets, roads, bridges, squares, paths and such like ways.

"I do not confine myself to any particular substance, or material for the blocks; they may be of stone, wood or any other substance or material suitable for paving.

"In this manner I can wedge the road together with any degree of intensity so as to prevent all displacement, and give it a complete firmness and solidity, even when put down on a foundation of mere shingle, gravel or sand.

"I sometimes make those series considerably taller, say from one inch to three inches, more or less, and I then fill the spaces c, c, c, c, between the alternate series with concrete or coal tar, asphalte or other bituminous substance, heated and mixed with gravel, sand or such like material."

No. 101100, A. D. 1870. EXHIBIT "L."

(Record, p. ~~170~~ 187)

Application filed October 29, 1869.

D. C Colby, for improved street pavement.

"I do hereby declare the following to be a full and exact description of the same, reference being had to the drawings that accompany and form a part of these specifications:

"Figure 1, is a perspective view of a portion of my pavement laid.

"Figure 2, wooden blocks, such as are set to form the upper structure of my pavement.

"Letter A, one of the full sized blocks, having six plane sides, and its angles right angles.

"B, the space between alternate rows of the blocks, these arranged in lines crosswise the street, and the spaces corresponding.

"C and D, strips of wood lying along the base of the blocks, A, and at the bottom of the spaces, B. The peculiar formation and arrangement of these strips will be more fully hereinafter set forth, with the reasons therefor.

"E, planking, forming the substructure, which should be laid on a well prepared bed of gravel.

"F, thick plank running crosswise beneath the abutting ends of the planks E.

"The objects of my invention are to secure a block pavement that shall be very economical as to the fitting of the lumber and laying the same, and to provide with more certainty the permanent position of the blocks, although arranged in such a manner that any number of the said blocks may be readily removed and replaced when it should become necessary to reach the street below for any purpose.

"My blocks have simple plane sides, but to prevent any of the finer particles from the concrete or filling in the upper part of the spaces B from falling down and working their way beneath blocks A, I use two strips, C and D, each varying in thickness as to its two opposite edges. Before using I slightly tack the two together, as illustrated on the right of figure 1.

"Now, having the substructure in readiness, I stand a row of blocks at the place of beginning, across the street from curbstone to curbstone, then take the compound strips, C and D, and place them in a position, as illustrated on the right of figure 1 of the drawings, a line of these extending quite across in front of the said line of blocks, and resting upon the substructure E.

"It will be observed that one of the strips, C and D, lies higher up than its fellow, and that the two sides in contact are beveling, so that, after a series of rows of the blocks, A, and the compound strips are laid, and the filling for the spaces, B, above these strips is to be tamped in, the pressure thus brought to bear upon the top of D will force it down to a level with its fellow C, and the result will be to fill entirely and closely the lower part of the space B, and not only prevent all fine parts, from above, from falling down, but also keep the blocks more surely in place.

"The blocks may be six inches or more deep, three inches or so thick, and of such width as the lumber from which they are being formed may suggest.

"The spaces B, if to be filled with small sand and gravel, may well be not more than one inch wide; but if to be filled with small stones, broken stone, coarse concrete and the like, they may be two inches or more.

"We recommend to have these spaces wide and as much coarse material used in filling as can be, and still form a good, tenacious and hard concrete.

"A broken stone, gravel, or cement substructure may well, on firm soils, be substituted for the wooden plank E.

"I do not claim using the substructure E, nor filling the spaces B, with gravel, concrete, or stone, as my invention consists in making use of the two strips, C and D, so formed and laid that they shall more fully fill the lower portion of the spaces, B, laterally when the filling above has been forced down as hereinbefore explained.

"What I claim as of my invention, and desire to secure by letters patent, is the two strips, C and D, when used in combi-

nation with the blocks A, and formed to operate substantially as described and set forth."

No. 101590, A. D. 1870. EXHIBIT "M."

(Record p. 185.)

Application filed November 13, 1865.

Tallmadge E. Brown, for improvement in wood pavement.

"The nature of my invention consists in providing and arranging blocks of a peculiar shape, in manner to form wedge-shaped crevices for the reception of earth or gravel, wherein such earth and gravel will be returned to act as a key to bind and confine the blocks in their place.

"Figure 1 represents a section of road paved with the blocks complete. Fig. 2 represents the straight side of a block, with the inclined side at E. Fig. 3 represents the top of a block, and also the section of the base D. Fig. 4 represents the straight side of a block, which is set next to the inclined side of the adjoining block.

"In Fig. 1, letter A represents the top of the block; B the side and E the crevice and gravel. The blocks should, of course, be placed so that the gravel spaces may extend lengthwise across the direction of the street or road, so that, besides wedging and holding the blocks securely, they may furnish a better foothold for animals drawing heavy loads.

"In the drawing, the front edge of the pavement, as shown, represents the side next the curb, or a section parallel to the curb.

"It is obvious that the wedge-shaped crevices may also be formed by setting the above described blocks so that two vertical sides and two inclined sides come together alternately, as shown in fig. 5; and it is equally obvious that two blocks having their vertical sides together, may be replaced by a single block, having two inclined faces, as shown in fig. 6, without any material change of plan, and with a considerable saving of labor and expense in the construction.

"To construct my pavement, prepare the roadway by grading it to the proper form and ramming solid; then set the blocks as shown in fig. 1, confining them permanently between the curbs of walks, then fill and ram the crevices with earth and gravel

"I do not claim a wood pavement composed of wedge-shaped blocks, when the blocks are laid alternately on the larger and smaller ends, so as to form a continuous surface of wood, but what I do claim and desire to secure by letters patent of the United States, is a wood pavement composed of blocks, each side having a single plane surface, and one or more of the sides being inclined, and the blocks being so laid on their larger ends as to form wedge-shaped grooves or spaces to receive concrete or other suitable filling, substantially as set forth."

No. 5287, A. D. 1825. EXHIBIT "N."

(Additional Record, p. 54.)

John J. A. MacCarthy, for a new and improved pavement, pitching or covering for streets, roads, ways and places.

"Stone or any other material or materials, whether natural or artificial and of any adequate size, is formed into a block, solid or otherwise, plane on the upper and under surfaces * * * the space intended to be paved shall be paved or covered with blocks formed, as aforesaid; cement, gravel, *sand*, or other materials may or may not be interposed between each block, but I prefer not to use either."

EXHIBIT "WILLIAMS."

(Record, p. 173.)

Application for Patent filed June 10, 1868.

H. F. Williams, for improvements in wooden pavements.

"My invention consists in making a cheap wooden pavement for country roads, by setting blocks of common split wood on end and filling the interstices between the blocks as hereinafter described.

"I take any ordinary timber suitable for common cord wood, and saw the logs into square ended blocks of from six to ten inches in length, and split them into pieces, about the size of ordinary cord wood, or I saw ordinary cord wood into blocks of equal length and about the length above mentioned. I then grade the road to the proper level (having reference to the length of the blocks to be used), and cover it with a bed of sand or pulverized earth; I then set the blocks of split wood on end, upon said bed of sand or earth as compactly as their irregular shapes will conveniently permit; I then cover the whole surface with fine gravel, and work the same down into the interstices between the blocks, by raking or otherwise moving the gravel over the surface of the pavement, and where the spaces are large enough to admit of it, I ram the gravel down with a suitable rammer; after the gravel has been well worked into the larger spaces, I apply sand in a similar manner to fill the smaller, and I then hammer down the blocks by means of heavy beetles, as paving stones are usually hammered down. I then cover the whole surface with a coating of coal tar or other similar pitchy substance, applied hot, and finally cover this with a layer of coarse sand."

11-604

OFFICE SUPREME COURT U. S.
FILED
APR 18 1884
JAMES H. McKENNEY, Clerk.

Supreme Court of the United States.

OCTOBER TERM, 1883.

No. 345.

ROBERT C. PHILLIPS, EUGENE ROBINSON AND JESSE H. FARWELL, APLELLANTS,

vs.

THE CITY OF DETROIT.

BRIEF FOR APPELLEE.

E. A. WEST,
L. L. BOND,
OF COUNSEL.

LESTER L. BOND,
FOR APPELLEE.

Supreme Court of the United States.

OCTOBER TERM, 1883.

No. 345.

ROBERT C. PHILLIPS, EUGENE ROBINSON AND JESSE H. FARWELL, Aplellants,

vs.

THE CITY OF DETROIT.

BRIEF FOR APPELLEE.

The action is founded upon patent No. 121,544, issued to R. C. Phillips, December 5, 1871, for an Improvement in Wooden Pavements.

The appeal is taken from the decree of the Court, dismissing the Bill for the reasons stated in the opinion of His Honor Judge Brown, commencing on p. 188, from which it appears that the Court below dismissed the Bill on two grounds:

First, that a patentable subject matter was not disclosed in and by the specification of that patent.

Second, that the combination or pavement claimed was anticipated in and by the older art.

We have not seen the appellant's brief, but we take it for granted that these two points are the ones assigned for error, and upon which this Court will be asked to reverse the decree below. At all events these two points are the only vital ones in the case, and we therefore proceed with their consideration.

I.

1. The determination of the question as to whether the patent itself discloses a patentable invention, involves the consideration of the specification and claim, and of the older art.

Patents are to be construed: first, upon their faces; and second, by their relation to the older art.

Curtis on Patents, Secs. 454, 5, 6, & 8.

The first point under these authorities is to be partly resolved upon consideration of the second question, or the effect of the older art upon the patent, but it will be seen upon an examination of the patent itself, when taken in connection with the disclaimer and the suggested alternatives, that the patent does not upon its face disclose a patentable invention or subject matter.

The disclaimer and claim are as follows:

"I do *not* claim broadly the use of wooden blocks in the "state in which they are *cut from the tree or branches*; nor yet "do I claim *the foundation* of stone or gravel, and the *filling of* "*the spaces* between the block with sand or gravel, separately "considered; but

"What I do claim as my invention, and desire to secure by "letters patent, is

"*A wooden pavement*, composed of blocks of *any desired* "wood, cut from the trunks or branches of trees or saplings of "*any desired* length, in their natural form, the bark only being "removed, placed with their fibers vertical, upon a bed of bro- "ken stone and gravel, *or sand, or either* of them, the spaces "between the blocks being filled with gravel *or sand*, the whole "made compact by ramming, rolling, or *other proper method*, "as herein shown and described."

In stating the nature of the invention, the patentee says:

"My improvement consists *mainly* in the use of wood of "any suitable kind, in its natural or undress state—that is, in "the form of *round blocks or sections of small trees*, or the "branches of trees, from which the bark has been removed." In his disclaimer he says: "I do not claim broadly the use of "wooden blocks in the state in which they are cut from the tree "or branches." Under this disclaimer, what becomes of the main improvement?"

In the same statement of invention, referring to the foundation, the patentee says: These (blocks) are placed upon end "upon a bed or foundation *composed of a stratum or layer of* "*broken stone about eight inches deep, upon which a course of* "*coarse sand or gravel, of, say, six inches in depth, is spread, the* "*whole properly rolled or rammed.*" From this statement in the nature of the invention we would understand that there was at least a special foundation, but in the disclaimer we find this: "Nor yet do I claim the foundation of stone or gravel;" and in the claim we find that the blocks are to be laid "upon a bed of *broken stone* and *gravel*, or *sand, or either of them*." Instead,

therefore, of finding that any special foundation is required under the terms of the patent, we find that the constructor is left to use any foundation that his skill or judgment may dictate.

Referring again to the statement of invention, we find that in reference to filling the spaces between the blocks, the patentee says: "The spaces or openings between the blocks are "then filled with good hard coarse gravel *and* sand, and again "rolled or rammed." In his disclaimer he says; "Nor yet do I "claim the filling of the spaces between the blocks with sand *or* "gravel," and in his claim he says "the spaces between the "blocks being filled with gravel *or* sand."

In his specification the patentee states that from the old and well known forms of blocks, he has selected the round ones of natural diameter; that from the old and well known foundations, or methods of forming them, he has selected the one which has a broken stone or macadam substratum, covered with a sand or gravel stratum, but you can use for this purpose any of the others, either all broken stone, all gravel, or all sand; and that for the interspace filling he has selected one composed of coarse gravel *and* sand, but you can use either. Each statement of *novelty and of invention* mentioned, is negatived by a counter statement that each part so named is old and well known, and *is not of his invention.*

In considering this branch of the case, the following points must be remembered: that the old blocks, the use of which Phillips disclaims as not being of his invention, are the same blocks set in a pavement in the same identical way, for the same purpose, and that these blocks, as already found in the art, had all of the advantages claimed for them by Phillips.

That a sand or gravel filling for the spaces, which is "*the* filling for *the* spaces between *the* blocks," must be the same filling, in the same spaces, between the same disclaimed natural round blocks.

That the foundation disclaimed and claimed is the same foundation, in a pavement.

The pavement in controversy can be as well laid under the disclaimer as under the claim.

The patent does not state, show or claim a new idea, thought, purpose, effect or result, which renders the completed pavement a new one, or a new manufacture within the purview of the patent law, as appears from the following authorities, and those cited further on.

In *Collar Co. vs. Van Dusen*, 23 Wall., 563, it was held that where the patent was for a completed article, invention was just as essential to the validity of patents of this class as for machine or other patents. The law is there stated as follows:

"Articles of manufacture may be new in the commercial "sense when they are not new in the sense of the patent law. "New articles of commerce are not patentable as new manu- "factures, unless it appears in the given case, that the produc- "tion of the new article involved the exercise of invention or "discovery beyond what was necessary to construct the appa- "ratus for its manufacture or production."

"Nothing short of invention or discovery will support a "patent for a manufacture, any more than for an art, machine, "or composition of matter, for which proposition there is abun- "dant authority in the decisions of this Court."

In *Dunbar vs. Myers*, 4 Otto, 196, the same law in reference to patent rights was repeated as follows:

"Rights of the kind are given *only to inventors or discov-*
"*erers* of some new and useful art, machine, manufacture, or
"composition of matter, or some new and useful improvement
"thereof; and the law is well settled that *nothing short of in-*
"*vention or discovery will support a patent for any such al-*
"*leged new and useful improvement.*"

This was re-stated with emphasis in *Atlantic Works vs. Brady*, 107 U. S., 192.

There is not a thing mentioned in the specification, which is not in terms admitted to be old and well-known in the art of paving. All that is or can be claimed for the pavement is, that it may in the long run be cheaper and better, but if this is true, it is not sufficient to support a patent. The law on this point is stated as follows in *Roberts vs. Ryer*, 91 U. S., 159:

"*If there was any change of construction suggested, it was*
"*only to increase its capacity for usefulness.* It was a mere car-
"rying forward, or new, or more extended application of the
"original thought, *a change only in form, proportions or degree,*
"doing substantially the same thing *in the same way*, by sub-
"stantially *the same means, with better results. This is not such*
"*an invention as will sustain a patent.* We so decided no longer
"ago than the last term, in *Smith vs. Nichols*, 21 Wall., 112."

This rule or statement was enforced by this Court in *Reckendorfer vs. Faber*, 92 U. S., p. 356, as follows:

"The law requires more *than a change of form* or *juxta-*
"*position of parts*, or of *the external arrangement* of things, or
"*of the order in which they are used*, to give patentability. (Cur-

"tis on Patents, Sec. 50; *Hailes vs. Van Wormer*, 20 Wall., 353.) A double use is not patentable, nor does its *cheapness* "make it so. (Curtis. Secs. 56, 73.) An instrument of manu- "facture which is the result of mechanical skill, merely, is not "patentable. Mechanical skill is one thing; invention is a dif- "ferent thing. Perfection of workmanship, however much it "may increase the convenience, extend the use or diminish ex- "pense, *is not patentable*. The distinction between the mechan- "ical skill, with its conveniences and advantages, and inventive "genius, is recognized in all cases. (*Rubber Tip Pencil Co. vs.* "*Howard*, and other cases, *supra:* Curtis, Sec. 72 b.)"

The most satisfactory way of analyzing the complainant's patent, is to proceed to construct a pavement in accordance with its terms. The first thing is the selection of the material. It is wood; locust is preferred, but oak, cedar, chestnut, yellow pine, or any other suitable wood, will do. Locust can be obtained in only a few localities; elsewhere we must do the best we can to make a proper selection. What size must it be? Anywhere from three to twelve inches, or upwards, in diameter. How long shall we cut the blocks? Six inches will do, but you may cut them "of any desired length." It is well-known that the immature sap-wood of oak, pine, and nearly all —if not all— of the woods, *will not endure*, when placed in contact with the earth. Shall we use sap-wood? Select anything, trunks, limbs, or *saplings*, just as you think best. Shall we treat them with some preservative? Just as you like about that; they may be used as they come from the forest, or they may be treated by any common process used for preventing decay, only take the bark off.

Having obtained our blocks without any assistance from the specification, for we have so far had all left to our judgment, in selecting from the older art; we now ask what kind of a foundation we shall use, and we are told to use one having a layer of broken stone "*about* eight inches deep," covered with a layer of coarse sand or gravel "*say six inches in depth*," *or* you may lay them "upon a bed of broken stone and gravel *or* sand, or *either* of them," just as you choose to select. Shall we compact this foundation? Yes, roll it or ram it, whichever you think best. It is all old and common; make your own selection.

Having selected one of the old foundations, and placed the disclaimed blocks on this foundation, we then follow Reynolds' instruction to place the blocks side by side with the fiber vertical, which is the only way in which such blocks could be placed. What shall we do with the spaces? Phillips says, fill them. What with? "*Good hard coarse gravel and sand.*" With "gravel *or* sand"; make your own selection.

We have now made a pavement according to our best judgment and skill, without aid from the patent. Shall we compact it before we throw it open for use? Yes. There are various ways of doing this; the most common are to *roll*, *ram*, or to *cement* the filling together and to the blocks? Which shall we use? Make it compact by ramming, rolling, *or other proper method*."

By this method of analyzing the patent—which is the proper one—we find that the patent contains no invention, and is void, it being for a mere matter of judgment in selecting, and skill in assembling or constructing the parts. It goes much fur-

ther and leaves everything, except the natural form of the block and the peeling of the bark, to the judgment and skill of those attempting to use the specification in actual practice. The patent further depends upon the judgment and skill of the constructor in omitting things, as the blocks may be round, or sections of small trees; they may be of any suitable wood; they may be treated by any common process to prevent decay; they may be of any size, large ones may be split; the foundation may be of sand; the filling may be of sand, &c.

Which ever way we test the patent, we inevitably come to the same conclusion, that the completed pavement claimed, does not contain one single element of novelty in its parts, in its mode of construction, or in the completed combination of these old parts, and that its supposed excellencies are all due to skill and judgment, without a particle of invention.

The entire pavement is claimed. There is no claim for any improvement in the blocks, foundation, filling, arrangement, process, or manipulation. The patent must stand or fall for the pavement as an entirety. In Evans vs. Eaton, 7 Wheaton 256, it was long ago decided, that if a part was old it must be separated from the new by the specification, so that just what was new might be known, without having to resort to the evidence for that purpose. The syllabus is in part as follows:

"When the patent is for an improvement, *the nature and* "*extent of the improvement must be stated in the specification*, "and it is not sufficient that it be made out and *shown at the* "*trial, or established by comparing the machine* specified in the "patent *with former machines in use.*"

See also Curtis on Patents. Sec. 56.

Things left to the judgment of the user, or stated under a recommendation, cannot be of the essence of the invention, or be covered by the claim.

Sewall vs. Jones, 91 U. S., p. 185.

Where a patent claimed the exclusive use of making lace of silk and cotton thread, it was held void on showing that silk and thread had been before used for the same purpose, but not in the same mode.

The King vs. Else, 1 Web. P. C. 76.

II.

In determining the question of novelty, the rule is that we are to consider first, the words, that is, the specification and claim, and second, the relation of the invention claimed to the older art, or practice in the art.

This examination of the older art is necessary in order to determine how much of that which is described belongs to the public, and to determine to what extent the patentee has advanced the art from what it was at the time he entered into the particular field, and made his claim. When this is done, the boundaries of the invention or improvement can be ascertained, and its extent measured. Until this is done, all is uncertainty.

That these questions are not settled by the action of the Patent Office, but are to be settled by the Court from the state of the art shown, appears from the following in *Reckendorfer vs. Faber*, 2 Otto, 352.

"The counsel says again, "Is the invention sufficiently "useful and important? This the Commissioner settles for him-

"self by the use of his own judgment. It is a question of offi-
"cial judgment. These questions are all questions of official
"judgment, and are all settled by the judgment of the commis-
"sioner. His judgment goes to the same extent upon each
"question. He determines and decides for the purpose of is-
"suing or refusing a patent. When the patent is sought to be
"enforced, the questions, and each of them, are open to judicial
"examination. We see many reasons why *all the questions of*
"*invention, novelty, and prior use, should be open to examination*
"*in each case;* and such we believe to be the course of the au-
"thorities, and the practice of the courts."

We have already ascertained from the words of the specification, that the patent is not for any of the parts of which the pavement is composed, and not for any improvement of any of the parts, but is for a supposed new article of manufacture made from old and well-known materials, or in other words for a new pavement composed of old blocks, set on an old foundation, having old fillings in the spaces between the blocks, each and all prepared by old methods or processes, but in some way supposed to result in a new pavement.

This is where the specification puts the alleged invention; the title is for an "Improvement in Wooden Pavements," but the claim is for the entire pavement, disclaiming any improvements in the parts, processes, arrangements, or manipulations.

In determining the relation of the patent to the older art, all that we have to do is to ascertain whether any of the older pavements are substantially the same as the one claimed, or not.

Complainant's Expert, Henry, p. 99, puts the patent as a combination of three elements: 1st, "Blocks of wood in their natural form," that is, round blocks of varying diameters. 2d,

"A foundation of packed sand or gravel." 3d, "Sand, or gravel in the spaces between the blocks."

This exposition of the claim puts the supposed invention where the patent leaves it, and Mr. Henry properly ignored all of the conditions and manipulations which are anterior to the placing of the elements together in a completed pavement, except the direction to take off the bark, which has always been done, and the packing of the foundation, which is usually done. Taking the claim as it reads, and in the light of the analysis of it by the appellants' expert, we can institute intelligible comparisons with several of the older patented pavements, as follows:

PHILLIPS, 1871.

1. Blocks of wood in their natural form.

2. Packed foundation of sand or gravel.

3d. Spaces filled with sand or gravel.

PARKIN, 1839.

1. Blocks of wood in their natural form.

2. Foundation of sand, ashes, or sawdust, saturated or packed with pitch.

3. Spaces filled with sand or other earthy matter united with pitch.

PHILLIPS, 1871.

1. Round blocks or sections of wood cut from trees in their natural form, and placed with their fiber vertical.

2. Packed foundation of sand or gravel.

3. Spaces between the blocks to be filled with gravel or sand.

STEAD, 1839.

1. Round blocks "cut transversely out of fir or other "suitable timber," "and placed "with the fiber vertical."

2. Foundation to be "suitably prepared" by the usual "well-known means."

3. Spaces to be filled with wood, cement, or asphalt, or left open.

PHILLIPS, 1871.

1. "Blocks of any desired "wood cut from the trunks or "branches of trees or saplings "of any desired length, in their "natural form, the bark only "being removed, placed with "their fiber vertical."

2. Broken stone, sand, or gravel foundation, compacted.

3. Spaces between the blocks filled with sand or gravel.

PHILLIPS, 1871.

1. Round blocks cut from trees in their natural form.

2. Foundation of *sand*, gravel, or broken stone.

3. Sand or gravel filling in the spaces, covered by an inch of sand or gravel.

PHILLIPS, 1871.

1. Round blocks cut from trees.

REYNOLDS, 1841.

1. "Pieces of the trunks of "trees cut into suitable "lengths, "in their natural "state without being cut or "hewn into any particular "shapes, and placed with their "fiber vertical side by side."

2. Any suitable foundation (stone, sand or gravel, were then known as suitable).

3. Interstices between the blocks filled with fibers of wood, and concrete, or asphalt.

FOUNTAINEMOREAU, 1844.

1. Blocks cut from "any "log of wood," conforming to "the shape of the trees."

2. "I claim the mode or "method of preparing the "ground by *a layer of sand* for "the wooden," and other paving blocks.

3. Bricks, rubber, asphalt, cement, marine glue, bitumen, and other similar substances, covered by a bed or layer of sand.

WARREN, 1869.

1. Any known block.

2. Foundation of sand or gravel compacted.

2. Foundation, sand and gravel compacted.

3. Sand or gravel filling in the spaces.

3. Sand filling in the spaces.

Stow, of 1868, shows the same foundation and space-filling as Phillips; and Guidet, of 1869, also shows Phillips' exact foundation and space-filling. Both of these pavements are the same as Phillips', except that the blocks, which are combined with this foundation and filling, are not of the old and well known *round* form.

Seven completed pavements are here shown by the appellee, all of which combine in their construction the identical structure of Phillips, varying only, if at all, in the employment of well known equivalents, differing only in form. Parkin's pavement is identical in its combination, with the only difference that some of the parts are differently treated. Stead's pavement, made under Fig. 16, is the same pavement. Reynold's pavement has substantially the same combination, and has all of the saving and cheapness claimed for Phillips'. Fountainmoreau, with his brick filling, which to be used must be crushed, makes the identical pavement claimed by Phillips.

Stow and Guidet both construct their pavements in the identical manner of Phillips, the only variation being in the form of blocks used by them. Either of these pavements clearly anticipates Phillips' inventions, as the only difference is in the use of well-known equivalents.

Warren, Guidet, Stow and the city of Detroit have the same right to use the Parkin, Stead, Reynolds, or Fountainmoreau blocks, that Phillips has: to select that form of blocks

for use with the various foundations and space fillings mentioned in the Phillips patent; and to produce the identical Phillips pavement.

Other patents are exhibited to show the older art, and to show what was old and well known in the paving art.

Lindsay, of 1825, shows compacting by ramming.

Mac Carthy, of 1825, shows a sand filling between the blocks.

Stead, of 1838, shows the vertical placing of fibers in wooden blocks, compacted foundations of earth, or sand, and "sand or other fine filling" in the spaces between the blocks, and by taking this with his patent of 1839, we find Stead shows everything, in detail and in use, that Phillips shows.

Wood, of 1840, shows gravel or sand foundations, and that wood and stone blocks are used interchangeably.

Brown, of 1870 (1865) shows wooden blocks laid on a foundation of earth [or sand "rammed solid", with sand or gravel space fflling, without tar or cement of any kind.

Colby, of 1869, shows a broken stone and gravel foundation.

When the art as exhibited is fully considered, it is found that at the time Phillips entered this special field of wood pavements, there was nothing but skill and judgment left, for any one using the materials mentioned in appellants' patent.

It will also be seen that square, round, tree formed sections, hexagonal, octagonal, wedge-shaped, and other forms of blocks, were then well-known as equivalents for each other; that round blocks cut from trees in their natural form, were the best known of any of the forms; that foundations of stone, broken and in slabs, wood, asphalt, sand gravel, earth, con-

crete, in various forms, under various conditions, were in interchangeable use; that all sorts of space fillings, sand, gravel, asphalt, cement, composition, oakum, wood, brick, broken stone, and other things, had been indiscriminately used, and that the entire art was in 1871 open for the selection of any of these materials for use, as the judgment of the user might dictate.

The law on this subject is clear and well settled, and is fully stated in the following citations.

In *Stimpson vs. Woodman*, 10 Wall., 121, the Court says:

"Assuming the plaintiff to have been anticipated in the "construction of his machine in every part of it, except that the "prior machine used a smooth revolving roller, and the plaintiff "a figured one, but which figured roller had been used for peb-"bling leather by the pressure, and was well known, all of "which the jury would have been warranted in finding, the "engraving or stamping of the figure upon the surface of the "smooth roller, or *the substitution* of the old figured roller for "the purpose, *required no invention; the change, with the exist-"ing knowledge in the art, involved simply mechanical skill, "which is not patentable.*"

This was reiterated in still stronger terms in *Smith vs. Nichols*, 21 Wall., 112, where the Court says:

"A mere carrying forward of an original conception pat-"ented—a new and more extended application of it—involving "*change only of form, proportions,* or degree—the *substitution* "*of equivalents doing the same thing as did the original inven-"tion, by substantially the same means with better effects—is not "such invention as to sustain a patent.* It is the invention *of* "*what is new,* and not the arrival at *comparative superiority or* "*greater excellence in that which was already known, which the*

"*law protects as exclusive property*, and which it secures by "patent."

In *Brown vs. Piper*, 91 U. S. 41, the Court answers the objection to the fact that the older art was not practiced in precisely the same way as follows:

"It is insisted that the process was never applied by the "witness to the preservation of fish and meats.

"The answer is that this was simply the application by the "patentee of an old process to a new subject, without any ex- "ercise of the inventive faculty, and without the development of "any idea which can be deemed new or original in the sense of "the patent law. *The thing was within the circle of what was "well known before*, and belonged to the public. No one could "lawfully appropriate it to himself, and exclude others from "using it *in any usual way for any purpose to which it may be "desired to apply it.*"

Another decision is quoted as a complete answer to the objections made by the appellants' expert, that the old English and American patents do not contain the same *directions* as Phillips'. While it is insisted that they practically do, it is not necessary that they should. In *Tucker vs. Spalding*, 13 Wall., 453, the Court says:

"*It is no ground for rejecting the prior patent that it does "not profess to do the same things that the second patent does.* If "what it performs is *essentially the same*, and its *structure and "action suggest* to the mind of an ordinarily skillful mechanic *its "adaptation to the same use* as the second patent, *by the same "means*, this adaptation *is not a new invention*, and is not pat- "entable."

In this case the devices are the same, the result is the same, and the manipulations of the patent are substantially the same as those of the older art. The manipulations or processes practiced by the appellee are more widely different from those of the patent than the patent is different from the older art. Appellee's pavements are not infringements except upon the drag-net theory of construction contended for by appellants.

The doctrine of *Tucker vs. Spalding* was repeated in a later case, where the patent was for making ladies' hair nets with large and strong meshes filled with finer meshes made of fine thread. It was admitted that ladies' hair nets had not been so made before, but that similar fabrics had been previously made for other uses, such as fish nets. In this case, *Dalton vs. Jennings*, 93 U. S. 271.–the Court says:

"Letters Patent No. 124.340, issued to John Dalton, Mch. "5, 1872, for 'an alleged new and useful improvement in ladies' "hair-nets,' are void, because his specification and claim pre- "cisely and accurately describe various fabrics which had been "made and were in public use for a long time previous to his "application."

Phillips' description of his main improvement is in almost the exact language of Reynolds' description of the same thing, for the same purpose: Stead of his Figures 16 and 17: Parkins, of his Figure 30, and Fountainemoreau of his pavement.

Appellants contend that Phillips made a new pavement by a new arrangement of these well-known and previously combined elements of a wood pavement. If this is true it will not help them, as it is then a matter of better or worse, according to the skill used, and this will not support a patent. On this point the court in *Roemer vs. Simon*, 95 U. S. 217, says:

"Suffice it to say, that it is obvious from an inspection of the "specification that the real invention, if any, is in the staples or "clamps, and perhaps in the arrangement of two of them at the "top of the frame. *Doubtless one method of arrangement may "be better than another; but the particular method of attachment* "to the frame *cannot be very material, as any mechanic,* if fur- "nished with the clamps, *could affix the device in various equi- "valent forms.*

Besides the art shown as at various times patented, but now public, there is shown in the unpatented art a complete anticipation of the Phillips. The round block wood pavement used in Detroit, and described by the witness Hubbard Smith, as located at the foot of Brush street, where it runs into Atwater, is unquestionably the same pavement, and it shows the use of this pavement in that city at least thirty years prior to the Phillips claim. See pp. 142–3.

Other forms proven, show the use of wooden blocks, cut from trees in their natural form, with the bark removed, to be old in Detroit.

Shelley, pp. 148–9.
Owen, p. 151.
Farrand, p. 152.
Goodrich, pp. 152–3.
Chapoton, pp. 153–4.

Cubical and oblong wooden blocks were laid in Chicago on a compacted sand foundation, with an uncemented gravel filling between the blocks.

Thompson, pp. 111–12
Mackin, pp. 126–7.
Bristol, p. 138.

COBBLE STONE.

The old cobble-stone pavement is, under the law, a complete anticipation of the Phillips patent. There cannot be any question about its being composed of stone blocks, round in cross section and varying in diameter, laid in the same way, on the same foundation, using the same filling for the spaces; or about the fact that the ramming, rolling and setting the blocks, the ramming or pounding them down, covering with sand—in fact, the entire method of construction,—is copied bodily and literally from this ancient pavement. The only difference contended for is, that in this boulder pavement the blocks are of stone, in their natural circular form, while in Phillips they are of wood, of the old Parkin or Reynolds form, cut from trees in their natural form. *The difference is not a patentable difference.*

The cobble-stone pavers have the same right to take the old and well-known Parkin, Stead, Reynolds, or Fountainmoreau blocks as Phillips has. The change from one to another is a mere change of material, and is not patentable, and even it is a better or cheaper pavement, it does not help it.

In *MacNamara vs. Hulse*, Car. & Marsh 447; 2 Web., P. C. 128, n. the question arose as to whether a patent for a stone pavement or other suitable material, would cover a wood pavement, wood not being in use for paving purposes at the date of the patent. Abinger, C. B., held that it would, "though probably the plaintiff (patentee) never contemplated it."

The law on this subject is stated in *Hotchkiss vs. Greenwood*, 11 How., p. 256, as follows:

"Now it may very well be, that by connecting the clay or "porcelain knob with the metallic shank in this well known

"mode, an *article is produced better and cheaper* than in the case "of the metallic or wood knob; *but this does not result from any* "*new mechanical device or contrivance*, but from the fact, that "the material of which the knob is composed happens to be "better adapted to the purpose for which it is made. The im- "provement consists in *the superiority of the material and which* "*is not new* over that previously employed."

"But this of itself *can never be the subject of a patent.* "No one will pretend that a machine made, in whole or in part, "of materials better adapted to the purpose for which it is used "than the materials of which the old one is constructed, and "for that reason better and cheaper, can be distinguished from "the old one: or, in the sense of the patent law, can entitle "*the manufacturer to a patent.*"

"The difference is formal, and destitute of ingenuity or "invention. It may afford evidence of *judgment and skill in* "*the selection and adaptation of the materials* in the manu- "facture of the instrument for the purposes intended, but "nothing more. * * *

"For unless more ingenuity and skill in applying the old "method of fastening the shank and the knob were required "in the application of it to the clay or porcelain knob than "were possessed by an ordinary mechanic acquainted with "the business, there was an absence of that degree of skill and "ingenuity which constitute essential elements of every inven- "tion. In other words, *the improvement is the work of the* "*skillful mechanic, not that of the inventor.*"

This case was affirmed in *Hicks vs. Kelsey*, 18 Wallace, 637, and emphasized as follows:

"The question is whether the mere change of material

"making the curve of iron instead of wood and iron—was a "sufficient change to constitute invention; *the purpose being "the same, the means of accomplishing it being the same, and "the form of the reach and mode of operation being the same.*"

"It is certainly difficult to bring the case within any recog- "nized rule of novelty by which the patent can be sustained. "The use of one material instead of another in constructing a "known machine is, in most cases, so obviously a matter of "mere mechanical judgment, and not of invention, that it can- "not be called an invention, unless some new and useful result, "an increase of efficiency, or a decided saving in the operation, "is clearly attained. Some evidence was given to show that "the wagon-reach of the plaintiff *is a better reach, requiring "less repair, and having greater solidity than the wooden reach. "But it is not sufficient to bring the case out of the category "of more or less excellence of construction.*"

The law as stated in these cases, and in *Smith vs. Nichols*, 22 Wall., 112, and *Roberts vs. Ryer*, 91 U. S., 41, was applied to pavements in

Guidet vs. Brooklyn, 105, U. S., 550.

III.

We have not attempted to abstract the testimony, but we desire to call attention to a few of the points made, or attempted to be made, by its introduction.

The witness, Lawrence, whose deposition is used in making up the *prima facie* case, on pp. 92 and 95, Q. 9, C. Q. 11, makes the Phillips pavement substantially water-tight, and

says that there is no difficulty in making it "practically impervious to water," and thereby preserving it, while the expert, Henry, on pp. 107, contradicting the position taken in the *prima facie*, makes its preservation depend on the "free circulation of water to and from the block," by means of the sand filling.

Appellants thus take exactly opposite grounds as to what preserves the pavement, in reference to the exclusion or admission of water. The patent is silent on this subject.

Appellants have taken testimony tending to show that the splitting of blocks is injurious, and introduce a wood pile experiment. Yet the specification provides as follows: "Blocks of large size may be split in halves or other parts."

Numerous witnesses are called to prove that cedar is better than pine for paving purposes, but the patent says, "locust is "preferred. White oak, white cedar (*arbor vitæ*), chestnut, "*yellow pine*, and others, afford good material." As the patent directs the use of pine, all of this testimony is not only immaterial, but it is in opposition to the patent, and in contradiction thereof.

Considerable testimony tending to show that the use of tar induced dry rot has been taken, but the patent nowhere prohibits the use of tar, and, instead of prohibiting its use, it, in fact, permits it, or leaves it to the judgment of the constructor to use it or not. The specification states that the blocks "*may be treated by any of the processes commonly applied to ren-*"*der woods hard, and prevent decay.*" Tar is more commonly applied for this purpose than any other one thing.

Fountainemoreau, *p. 142*, says that, among other things,

"he uses *asphalt* "*to increase the durabitity of the wood* by di-
"minishing its exposure to the influence of air and water."

Stow, p. 179, in making a statement similar to that of Phillips, and for the same purpose, says: "The blocks before "being put down in the pavement, may be saturated with *coal* "*or gas tar*, or any liquid or hydro-cardon, or other resinous "substance which will tend *to preserve the wood from decay*."

The record thus shows that it is common practice to tar the blocks, and that they are tarred for preserving purposes or preventing decay; that it was one of the common processes used at the time the patent was granted, for the sole purpose of preventing decay. The conclusion that the use of tar is one of the things comtemplated by Phillips for preserving his blocks, and that its use is included in the patent, is irresistible.

Whether the use of tar is in fact beneficial or injurious, or whether the general belief among pavers that it is beneficial, is erroneous or not, are questions that cannot arise under the patent. Phillips does not prohibit its use, even if he does not in apt terms include it; he cannot, therefore, claim any benefit or consideration for its non use or use.

Proofs are taken to show that blocks of the form used are cheaper than some other forms termed by appellants' "manufactured blocks," but as already shown, the block in the identical form is very old, and is disclaimed by the patent. Phillips can claim nothing on that, or for that.

If the blocks were turned to true circles, it would not change the character of the completed pavements, and the

specification states that the blocks are to be "in the form of *round* blocks *or* sections of small trees."

This whole matter is well disposed of by the witness, Munday, who says that as Phillips only claims a pavement, when completed, he cannot claim anything for the blocks, foundations, or filling, separately considered, or claim any benefit for what is required to be done anterior to the completion of the pavement. P.. 63.

The pavement, as a whole, cannot be considered as an improvement in the art, as Phillips has only gone back to the original, simple and cheap pavements, which have been known, and which have been used more or less, for the last forty years. All that is claimed for it in the patent, is that it "can be laid easily, and with less expense than a cobble-stone pavement." If this statement is allowable and correct, then certainly the cobble-stone pavements belong to the same arts.

Upon a review of the case presented by the record and the law applicable thereto, we find;

1st. That the specification does not disclose a patentable subject matter, for the reasons that it nowhere discloses anything that is new; that it belongs to the domain of judgment and skill; and that it does not attempt to separate the old from the new.

2nd. That it is void for want of novelty in the art for the reasons that it is anticipated by Parkin and by Stead of 1838 add 1839; Reynolds, of 1841; Fountainmoreau, of 1844; Stow, of 1868; Warren, of 1869, and Guidet, of 1869; the Detroit wood pavemement on Brush street, and by the old cobble-stone pavements; and that at the best, it is only changing old forms, for equally well known old forms, for the same same purpose in the same combination, with the same results.

3rd. That the combination or pavement claimed, is not

new, and that it is not even claimed as an improvement, except as compared with cobble-stone pavements.

4th. That not one of the supposed advantages mentioned is attributable to any thing done by Phillips or claimed by any one for him as a result of the pavement as a whole.

5th. That appellants have not made out such a case on the questions of novelty and patentability as will entitle them to the relief prayed.

IV.

The question of infringement is not a difficult one on appellants' theory of the patent, or under the patent itself, as seventeen different pavements can be made under the directions of the specifications and the claim, and it would be strange if appellee did not hit some one of the great variety set forth in the patent.

The following analysis shows the variety of pavements covered by the patent:

Seri's	FOUNDATIONS.	BLOCKS.	SPACE FILLINGS.
1st.	Broken stone and gravel, stratified.	Round, or sections of Trees.	Sand and Gravel.
2d.	Broken stone and gravel, unstratified.	" " "	" "
3d.	Broken Stone and Sand	" " "	" "
4th.	Broken stone,	" " "	" "
5th.	Gravel,	" " "	" "
6th.	Sand,	" " "	" "
7th.	Sand,	" " "	Sand.
8th.	Sand,	" " "	Gravel.
9th.	Gravel,	" " "	"
10th.	Broken stone,	" " "	"
11th.	Broken stone,	" " "	Sand.
12th.	Broken stone and gravel,	" " "	"
13th.	" "	" " "	Gravel.
14th.	Broken stone and gravel, stratified,	" " "	"
15th.	Broken stone and gravel, unstratified,	" " "	Sand.
16th.	Sand and gravel,	" " "	"
17th.	" "	" " "	Gravel.

This illustration of the various pavements which are within the scope of the patent may seem rather curious than useful, but according to the specification under which the Detroit pavements were laid, (Ex. 10, p. 23) it will be seen that we have to go down to No. 17 to find the pavement used by appellee, which is the infringing pavement complained of. This contract aud Patrick, pp. 72 and 93, is the only evidence of what the city used.

The contract and Patrick, p. 93, agree, and it will be observed that asphaltum was used in the space filling and for a top dressing of the completed pavement. The kind of pavement described by Patrick, p. 72, is No. 8 of the list. Nos. 8 and 17 are the only forms used by the city.

No. 8 is Parkins' pavement, and No. 17 is Reynolds' and Fountainemoreau's.

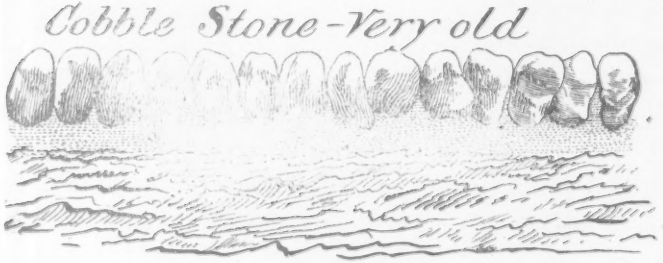
If the patent is valid, there is no infringement shown by the record, unless the patent covers the 8th and 17th variations, but this almost unlimited scope of the patent, is of itself a demonstration of its invalidity.

ABSTRACT GF PRIOR ART.

In order to show that the condition of the older art is correctly represented, and to show the bearing of the art on the appellants' patent, the following abstract is made.

The abstract is made chronologically, without regard to the relative importance of the exhibits.

Note.—When the page numbers are not marked, they refer to the "Transcript of Record," and when marked "A," they refer to the "Addition to Record."



"Q. In laying the cobble-stone pavement and the Phillips' "pavement what is the difference between the construction, if "any, of thestone and the block?"

"A. *The bed is made the same.* One we lay to the line and "the other we lay out with a board and scrape it. We roll one "and smooth the other down. *We fill the spaces* in the cobble-"stone as we go along. In the Phillips, the blocks are laid on "the sand, and the space is filled after the blocks are laid. *The "foundation is the same in both.*"

H. Smith, p. 144.

The foundation and filling for a cobble-stone pavement is

sand, and the finished pavement is covered with sand.

French, pp. 164–5.

ENGLISH PATENT.

No. 5,185, A. D. 1825. Exhibit "I."

To John Lindsay, for certain improvements in the construction or formation of the horse and carriage ways of streets, turnpikes and other roads.

Foundation. "I would recommend the under surface to be "covered with rough stones, laid with their broadest ends down- "wards, as shown at E, E, and between these, wedge-formed "pieces should be laid to fill in the interstices, over which a "stratum of broken granite should be laid of the usual thick- "ness." p. 29, A.

Superstructure and space filling. "Paved with usual sized "paving stones, but the method of arranging or laying them is "as follows: Instead of laying them with their broadest ends "upwards, I lay them with their broadest ends downwards, and "as each stone is made of a wedge form, this leaves a consider- "ble space open between the stones; these I close with smaller "stones of a wedge form, which being carefully placed and "well rammed down, after a sufficient quantity of fine gravel "or grout has been worked between them, will make a pave- "ment nearly as substantial as a solid sheet of granite." p. 28, A.

ENGLISH PATENT.

No. 5,287, A, D. 1825. Exhibit "N."

To John J. A. MacCarthy, for a new and improved pavement, pitching or covering for streets, roads, ways and places.

The foundation is not described, except by referring to "brick and other pavements." The drawing shows an earth foundation.

Superstructure. "Stone or *any other material* or materials, "whether natural or artificial and of any adequate size, is form-"ed into a block, solid or otherwise, plane on the upper and "under surfaces." p. 55, A.

Space filling. "The space intended to be paved shall be "paved or covered with blocks formed as aforesaid; cement, "gravel, *sand*, or other materials may or may not be interposed "between each block, but I prefer not to use either." p. 55, A.

ENGLISH PATENT.

No. 7,645, A. D. 1838. Exhibit "B."

To David Stead, for making or paving public streets and highways, and public and private roads, courts and bridges, with timber or wooden blocks.

Superstructure. "The invention consists of a mode of pav-"ing by means of wooden blocks * * of a sexagonal figure "* * * I do not, however, confine my claim to sexagonal "blocks, as triangular or square blocks placed diagonally, may "be used with advantage; and in order further to secure the "blocks from sinking, or getting displaced, I employ dowels or "pins to each block, as shown in the drawings, though *I do not "consider this requisite in all cases.*" p. 7, A.

Foundation and space filling. "The blocks of wood are to "be placed on the earth, or formed with *the grain of the wood "in a vertical position;* and in applying such blocks as a paving, "the surface of the road or other such way *is to be prepared in*

"*as solid a condition as possible*, and to the figure or intended "slopes, and the blocks are successively to be applied, having "*sand or other fine filling*, driving each block up to those against "which it is to rest." p. 7, A.

"It will be found advantageous to fill up the interstices be- "tween the blocks of wood, with melted pitch, or pitch and sand "or earth combined, though this is not essential, and I make no "claim for such using of pitch and sand or earth." p, 8, A.

ENGLISH PATENT.

No. 8041, A. D. 1839. Exhibit "A."

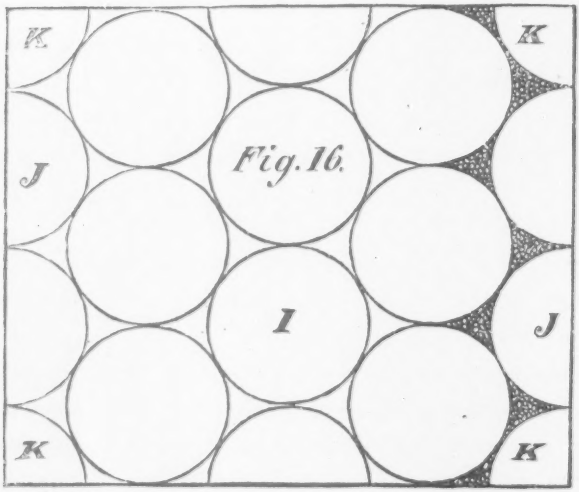
To David Stead, for an improved mode or method of making or paving private streets and highways, and public and private roads, parks, courts and bridges, with timber or wooden blocks.

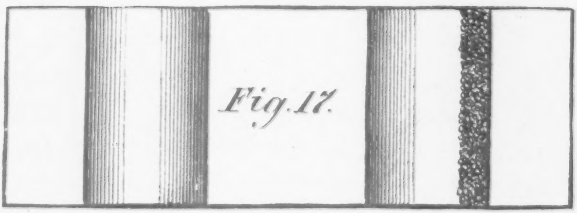
Foundation. "The invention consists in the paving * * "by means of wooden blocks so shaped and placed as to sup- "port each other in a close and compact manner, the foundation "being first suitably prepared to the required figure *by the usual* "*well known means*, to receive such wooden blocks, which are "so disposed as to present an even and uniform surface, and al- "ways having their fibers in a vertical position, whether the "raadway has a curved, inclined, or horizontal face." p. 2, A.

Superstructure. "The blocks which I use for the improved "paving, are *cut transversely out of fir or other suitable timber*, "or they may be composed of deal plank ends or small pieces "of timber, firmly cemented together, to any of the required

"figures hereinafter described by means of asphalte or any "other suitable material." p. 2, A.

Stead's, April 23rd, 1839.





"Figures 16 and 17 is a plan and end view of another kind "of the improved paving, which is formed by a series of *circu-* "*lar blocks* i, i, i, placed as represented in the drawing and made "parallel to the curb stone of the foot way, by the semi-circular "and quadrant pieces j and k." p. 4, A.

Space filling. "The smaller interstices or cavities between "such circular blocks, may be either filled with wooden pieces "suited to their shape, or fitted up with cement or asphalte, as "may be found convenient; and when this kind of paving is "laid upon an inclined surface, I should recommend the cavi-"ties to be not filled up." p. 4, A.

ENGLISH PATENT.

No. 8026, A. D. 1839. Exhibit "J."

To Thomas Parkin, for improvements in railroad and other carriages, in wheels for such carriages, and in roads and ways on which they are to travel.

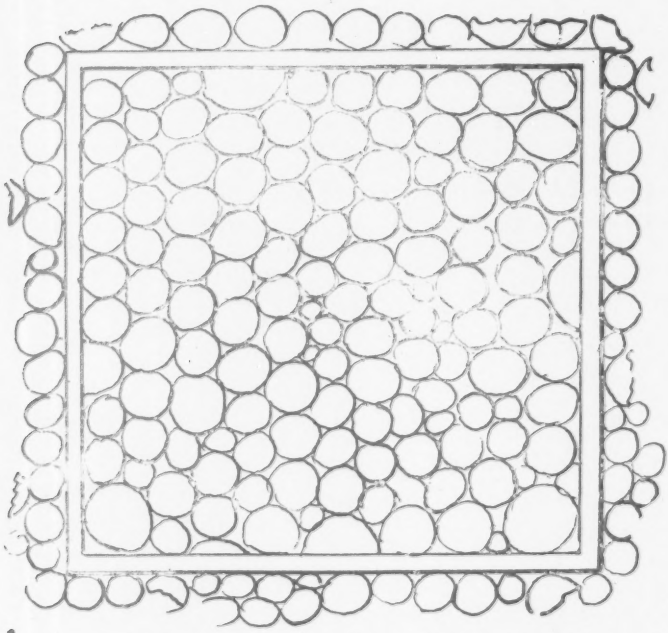
Foundation. "And according to my sixth mode of pav-"ing, I claim the right of laying upon *the natural ground* or "foundation of the road, *a layer of sand*, ashes or saw dust, sat-"urated with tar or other bituminous substance, especially if "boiled, for the blocks to rest upon." p. 34, A.

This was disclaimed for want of novelty. p. 50, A.

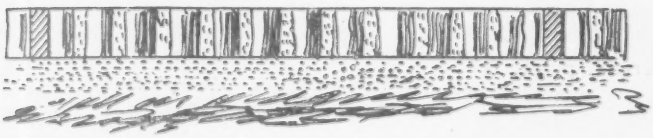
Space filling. "According to my fifth mode, in paving "with blocks or pieces of wood of any convenient figure, with "the grain either vertical or inclined, cemented together by "filling the interstices between the blocks with a mixture of "sand, pulverized chalk, brick dust, or other earthy matter "united with pitch or other bituminous substances, or suitable "cement." p. 34, A.

Superstructure and space filling, "In the case of small "blocks being used, the grooves or furrows are formed by "chamfering off the outer edges of the upper surfaces of the

"blocks, which furrows and chamferings may be made deep,
"and filled up with asphalte or other cement, *or gravel and*
"*sand*, the object being in both cases to prevent the horses' feet
"slipping." p. 35, A.



Parkins' April 9th 1839.
Fig. 30.



"Figure 30 shows a batch of blocks, of various sizes and

"figures, cemented together within a square space, which batch "may be removed in a mass when the cement is melted away "from the surrounding straight grooves." p. 39, A.

The plan view here shown is copied from the patent; the sectional view has been made from the description of the foundation, and added to Fig. 30.

ENGLISH PATENT.

No. 8,657, A. D. 1840. Exhibit "K."

To Thomas Wood, the younger, for Improvements in paving streets, roads, bridges, squares, paths and such like ways.

Foundation. "In this manner I can wedge the road together "with any degree of intensity, so as to prevent all displacement "and give it a complete firmness and solidity, even when put "down on a *foundation* of mere *shingle, gravel, or sand.* p. 53, A.

Superstructure. "I do not confine myself to any particular "substance or material for the blocks, they may be of stone, "*wood*, or any other substance or material suitable for paving." p. 52, A.

Space filling. "I sometimes make those series considerably "taller, say from one inch to three inches, more or less, and I "then *fill the spaces* c, c, c, c, between the alternate series "with concrete or coal tar, asphalte, or other bituminous sub- "stance, heated, and mixed with *gravel, sand*, or such like ma- "terial." p. 53, A.

ENGLISH PATENT.

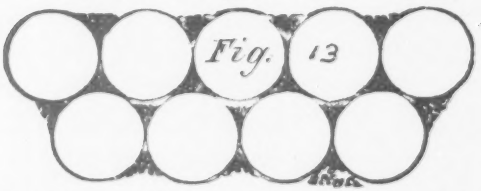
No. 8940. A. D. 1841. Exhibit "D."

To Osborne Reynolds, for improvements in paving streets, roads and ways.

Foundation. "My next improvement relates to the con- "struction of a suitable foundation * * This improvement "is represented in figures 3 and 4, the former showing the "foundation consisting of planks, beams or boards of wood." p. 14, A.

Space-filling. "The interstices between these blocks are "to be filled up with the compound mass of fibers of wood and "concrete or asphalte, hereinbefore described." p. 15, A.

Reynolds' April 27th. 1841.



Superstructure. "Another improvement consists in con- "structing the roadway with pieces of the trunks of trees, cut "into suitable lengths, as from three to ten inches, and placed "with their fibers vertical side by side in their natural state, with- "out being cut or hewn into any particular shapes." p. 15, A.

ENGLISH PATENT.

No. 9737, A. D. 1843. Exhibit "C."

To Henry Austin, for improvements in wood pavements, floorings and veneers.

Foundation. "The nature of my invention consists in glu-
"ing or cementing, in the manner after described, blocks of
"wood cut and placed, as after described, on to planks or
"slabs or other pieces of wood, or on to stone, slate or iron, for
"wood pavements. * * The wood, stone, slate, or iron, on
"which I glue or cement the blocks for pavements, I denominate
"the bed or foundation of the blocks." p. 9, A.

Superstructure and space filling. "I glue or cement the
"wooden blocks of any convenient shape and size, without any
"fastening or connection together of the blocks, and with inter-
"vals or spaces between them to the entire depth of the blocks;
"these intervals or spaces may be of the width of an inch and a
"half, or thereabouts, and are to be *filled* in with broken stone,
"refuse or broken slate, grit, gravel, *sand*, or any hard or any
"fibrous substances. this filling in being cemented or concreted
"together with liquid lime or cement poured in, or with pitch
"or lac and caoutchouc dissolved in naphtha, melted and poured
"in, or with any other adhesive liquid materials." p. 9, A.

ENGLISH PATENT.

No. 10,187, A. D. 1844. Exhibit "E."

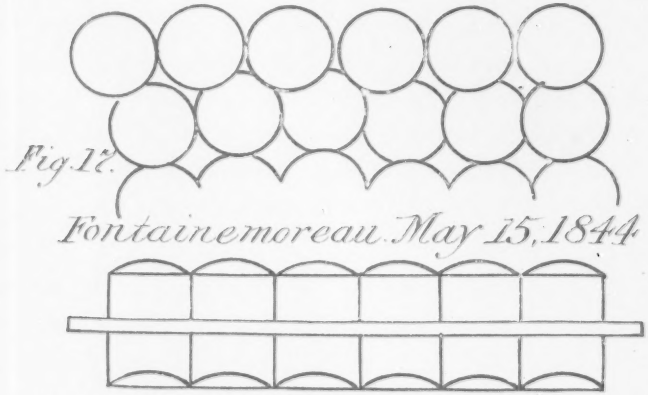
To Peter Armand, Le Comte de Fountainemoreau, for a new and improved mode or method of paving and covering roads and other ways and surfaces.

Foundation. "The ground for laying my new and improved
"mode of paving does not require any setting, it is only to be
"rendered smooth and even, and then to be covered *with a bed*
"*or layer of sand*, by laying the blocks upon a body of suffi-

"cient elasticity to yield to the jolts and weight of the passing "carriages." p. 18, A.

Superstructure. "The new or improved mode or method "of paving and covering roads and other ways or surfaces, "consists in the manner in which I set, assemble and join to- "gether wooden blocks, by means of rods, key rods, pins or "bolts, * * and in combining wooden blocks with granite, "or wooden blocks with bricks, india rubber, asphalte, cement, "marine glue, and other similar substances." p. 17, A.

"This form of paving allows the employment of *round* "blocks, *any log of wood may be used* for this kind of paving." p. 19, A.



"Instead of hexagonal I can employ with equal advantage "circular blocks, as shown in the plan and two sections which "compose figure 17, drawing 11." p. 19, A.

"*Any kind* of wood, whatever may be its *size*, can be *used* "*for this form of paving*, because this form approaches very "nearly to *the shape of the trees*, and it is more easily prepared, "and *does not require* any particular labor." p. 20, A.

Space filling. "I make another arrangement, by cutting "away *from the faces* of the block three-quarters or one inch "of wood, which space will be afterwards filled with bitumen." p. 25, A.

As

In another place he mentiones bitumen or asphalte. ~~Se~~ phalt is a mixture of about 80 per cent. stone, with 20 per cent. of bitumen.

"What I claim for the invention is—

"First, the mode or method of preparing the ground by a "layer of sand for the wooden, and combined wood and granite, "wood and brick, asphalte, bitumen, kinds of paving as I have "before described." p. 26, A.

UNITED STATES PATENT.

No. 101,590, April 5, 1879. EXHIBIT "M."

Application filed November 13, 1865.

To Tallmadge E. Brown, for improvement in wood pavement.

"The nature of my invention consists in providing and ar- "ranging blocks of a peculiar shape, in manner to form wedge- "shaped crevices for the reception of earth or gravel, wherein "such *earth and gravel* will be returned to *act as a key* to bind "and confine the blocks in their place." p. 186.

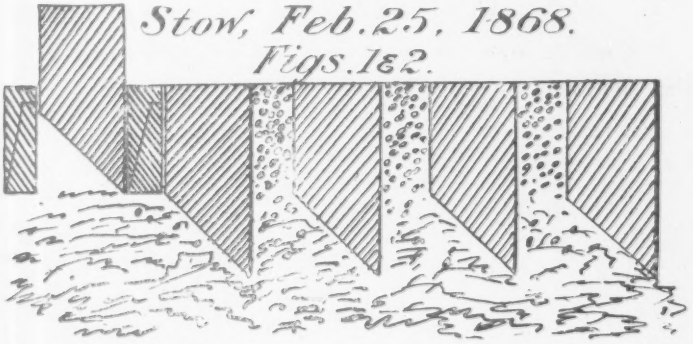
"Prepare the roadway by grading it to proper form, and "*ramming solid.*" p. 187.

UNITED STATES PATENT.

No. 74,862. Feb. 25, 1868. EXHIBIT "G."

To Henry M. Stow, for improved street pavement.

"The nature of my invention consists in driving down "into *a foundation bed of sand* or loose earth, tiers of wedge- "shaped wooden blocks, *with spaces* between said tiers *filled* "*with gravel*, as hereinafter more fully set forth." p. 178.



"A A, figs. 1 and 2 are wooden blocks as they stand in the "completed pavement, their lower ends being made in wedge "form, by beveling one side only, and said wedge-shaped ends "driven down into the *foundation bed of sand or earth*. B is a "*gravel* packing *between the tiers* of wooden blocks." p. 178.

"Or, instead of filling said spaces with *all gravel*, they "may be filled to within about an inch and a half of the top of "the blocks *with sand* well packed in with rammer and swage, "and the residue of the space *filled with gravel*, as "aforesaid." p. 179.

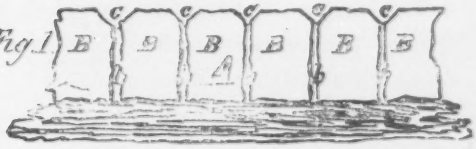
UNITED STATES PATENT.

No. 85,814, January 12, 1869. Exhibit "F."

To Charles Guidet, for improved stone pavement.

C. Guidet's, Jan. 12th, 1869.

Fig. 1



"Figure 1 represents a longitudinal section of this inven-"tion; figure 2 is a plan or top view thereof." p.175.

"A represents a section of my pavement which is compos-ed of a series of stone blocks, B." p. 176.

"The *open joints* left between the rugged surface *b*, of the "blocks *are filled with sand*, and the pavement becomes perfect-"ly *firm and solid*, and the single blocks are not liable to work "loose." p. 176.

The construction of the foundation is not stated, but as shown, is either earth or sand.

UNITED STATES PATENT.

No. 96,062, Oct. 19, 1869. EXHIBIT "H."

To Gardner E. Warren, for an improvement in laying street pavements.

Foundation. "The roading of the street is first brought "to the proper grade, the soil used for the purpose being almost "universally *a mixture of sand and gravel*, the latter being "greatly in excess of the former." p. 181.

Superstructure and filling. "Upon the foundation thus "prepared the pavement is to be directly laid in any well-known "manner."

"Should this pavement be composed of wood, its surface "is to be covered *with sand* and water, applied as before ex- "plained, by which means the *interstices* between the blocks "*are instantly filled*, thus avoiding the loss of time as well as "additional expenditure of animal labor." p. 181.

"What I claim for my invention, and desire to secure by "letters patent of the United States, is the process hereinbefore "explained, of laying street pavements, the same consisting, in "brief, of first grading the road bed, next puddling the mass "of soil, and after depositing the pavement thereupon, packing "the interstices between the blocks of the latter by means of "sand and water." p. 182.

UNITED STATES PATENT.

No. 101,100, March 22, 1870. Exhibit "L."

Application filed October 29, 1869.

To D. C. Colby, for improved street pavement.

"E, planking, forming the substructure, which should be "laid on a well prepared bed of gravel." p. 184.

"The blocks may be six inches or more deep, three inches "or so thick, and of such width as the lumber from which they "are being formed may suggest."

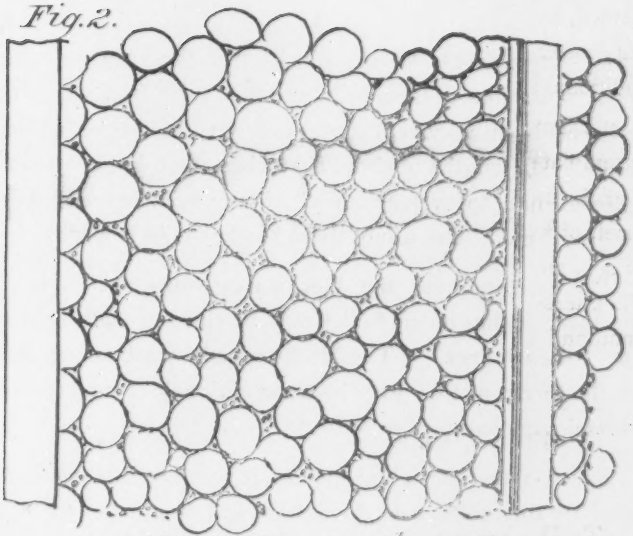
"The spaces B, if to be filled with *small sand* and gravel "may well be not more than one inch wide; but if to be filled "with small stones, broken stone, coarse concrete and the like, "they may be two inches or more." p. 184.

APPELLANTS' PATENT.

No. 121,544, December 5, 1871.

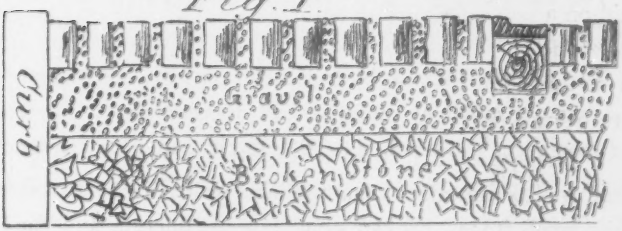
To R. C. Phillips, for an improvement in wooden pavements.

Fig. 2.



Phillips' Dec 5th 1871.

Fig. 1.



Foundation. The foundation shown is Macadam, eight inches deep; covered with six inches of gravel, stratified, and rolled or rammed. This foundation is disclaimed.

The variations for the foundation are: "stone or gravel," "broken stone or gravel and sand, or either of them." pp. 70, 71.

Superstructure. Wooden blocks, "in the form of round "blocks *or* sections of trees or branches of trees from which the "bark has been removed, cut at nearly right angles to thier "length." "In lengths of about six inches, their diameters vary- "ing from three to twelve inches," of any suitable wood, "yel- "low pine," etc. The use of these blocks is disclaimed.

The variations for the blocks are: "may be of any size from three inches upwards;" "may be split in half or other parts" for curb lines. "The blocks may be used as they come from the forest, or they may be treated by any of the processes commonly applied to prevent decay."

Space filling. "The spaces or openings between the blocks are then filled with good, hard coarse gravel *and* sand. The use of "sand *or* gravel" is disclaimed.

The variations for space filling are: "gravel *and* sand," "sand *or* gravel."

The foundation is to be rolled or rammed: the blocks are to be heavily rolled or rammed, and the completed pavement after the spaces are filled, is to be "again rolled or rammed," and "the whole is covered with gravel or sand to the depth of about one inch." "The whole made compact by ramming, rolling, or other proper methods." Ramming, rolling, and ce-

menting by the use of asphalt, bitumen, grout, or other cements, are all old, common, and proper methods of compacting and solidifying pavements.

Results. The only results stated to be beneficial or new are: "I thus produce a pavement which can be laid as easily and with less expense than a cobble stone pavement," and "more durable than the most approved wooden pavement hitherto in use."

It is not believed that either of these statements is true. A pavement nineteen inches deep, composed of a Macadam road, a gravel road, and a wooden block road, with an inch of top dressing, all combined in one, cannot be cheaper than a cobble stone pavement. And as the Phillips pavement was less than two years old when the application for a patent was filed, its durability was unknown.

Appellants' proofs of cheapness are all on a fictitious basis, as the comparisons are made for square, oblong, or regularly dressed blocks, with tree sections, when the tree sections are older than the dressed forms. See *Stead vs. Williams*, 7 Manning & Granger, 818, set up in answer, p. 12.

On the showing of the prior art, and the lack of anything in the patent to limit it to any specific forms or constructions, the Circuit Court could not do otherwise than find that the specifications failed to show any patentable subject matter, both as a question of fact, and a question of law.

The law on the subject of re-use is re-stated by this Court in the recent case of *The Penn. R. R. Co. vs. The Locomotive Safety Truck Co.*, 27 O. G., 208, as follows:

"It is settled by many decisions of this Court, which it is "unnecessary to quote from, or refer to in detail, that the appli- "cation of *an old process* or machine to a similar or analagous "subject, with no change in the manner of application, and no "result substantially distinct in its nature, will not sustain a "patent, even if the new form of result has not before been con- "templated."

The second conclusion reached by the Circuit Court, that the patent is fully anticipated in and by the older art, also seems to be inevitable under the facts shown, and the authorities cited.

If it is possible, under the claim made, to limit the patent to a pavement made of a stratified macadam and gravel foundation fourteen inches deep, more or less; to a specific kind of blocks; and to a specific filling for the spaces; then the same conclusions must follow, with a third conclusion, that appellee has not infringed the patent.

It will be contended that the patents to Warren, Colby, and Brown (Cowing), are not old enough to become a part of prior art, as Phillips carries the date of his invention back to July, 1869.

Brown shows a file date of 1865, p. 167, and this should be as good for the patent when used as a defense, as when used for a Bill of Complaint, but there is enough left to sustain the findings of the court below, if these three patents are not considered.

It would seem, under the statute regulating interferences, that when a patent, prior in date to the application upon which the patent is granted, is allowed to stand uncontested, it should

remain as part of the older art, whatever date of invention might be proven in court for the second patent. Otherwise the public is liable to be misled, and the element of uncertainty, which the law of interferences was designed to remove, still remains.

E. A. WEST,
L. L. BOND,
Of Counsel.

LESTER L. BOND,
For Appellee.